FOOD MANUFACTURE

Incorporating Food Industries Weekly

LEONARD HILL LIMITED, 17 STRATFORD PLACE, LONDON, W.1 JULY 2 1942

LASTING BEAUTY

"Staybrite" Steel is not a mere coating; its stainlessness is inherent—solidly rustless through and through—and it virtually lasts for ever.

Any operation in the working of the other noble and decorative materials can be carried out equally well in "Staybrite" Steel, the most beautiful and practical metal for a whole range of domestic products.

We are steelmakers and produce the steels from which these and other goods are fabricated. We ourselves do not manufacture the finished articles, but will gladly give the address of approved manufacturers.

"STAYBRITE"

REGD. TRADE MARK

SUPER RUSTLESS STEEL

● *Owing to the large demand, we are at present greatly restricted as regards the purposes for which this steel can be supplied*

FIRTH VICKERS STAINLESS STEELS, LTD., SHEFFIELD

THE STANDARD OF RELIABILITY

★ 'PYREMIST' ★

INSECTICIDE

Non Poisonous • Non Staining • Odourless

(As specified by Dr. C. Potter, Imperial College of Science and Technology.) For use against cocoa moth, Indian meal moth, etc., in mills, dried fruit stores, granaries, etc. (Samples on request.)

TRADE MARK

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TAS/AL 84

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LARGER AND BETTER GLASSWARE
DESIGNED FOR PRODUCTION PURPOSES

FLASKS WITH **UNIFORM** INTERNALLY TAPERED NECKS
(2½" diam. RUBBER BUNG FITS ALL THESE FLASKS)

EXTRA LARGE RUBBER BUNGS **MOULDED** EXACTLY TO SIZE

"HYSIL" GLASS

— FOR — *"Service to Science"*

SPECIAL BOLTHEAD FLASKS - - 10 and 20 LITRES
SPECIAL FILTER FLASKS - - - - 5 LITRES
SPECIAL **MOULDED** BUNGS - - - up to 4½" diam.

LAST, BUT NOT LEAST—

SPECIAL STONEWARE BUCHNER FUNNELS - up to 12" diam.
GUARANTEED NOT TO CRACK WITH VACUUM

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Telephone : Thornton Heath 3851
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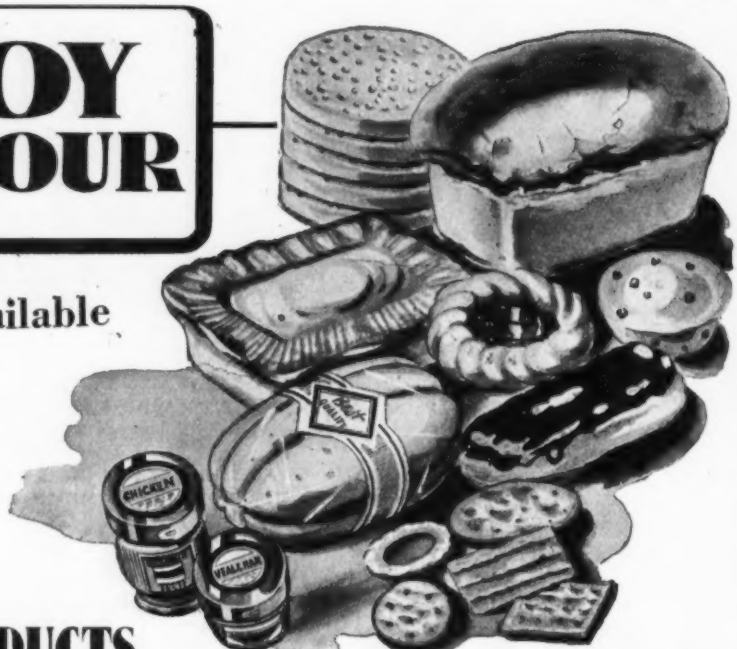
TRUSOY Soya FLOUR



Supplies are now available

PROTEINS	43·5%
FATS	20·5%
CARBOHYDRATES	20·0%

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Telegrams: TRUSOY, BISHOPS STORTFORD, HERTS.

Telephone: BISHOPS STORTFORD 1110

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LIMITED

Incorporating

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From the original Wapping works to a splendid new building in Pall Mall in 1890 and thence in 1931 to the present specially designed factory at Aintree, expansion has gone on—soundly based upon an utter devotion to the principles of faithful service and satisfaction to customers.

Standardisation of colours, conditioned papers, tested inks and varnishes, perfection in register, micro-accurate cutting—these scientific developments allied to natural colour photography and the "BR" revolving stock plan have gained for their famous "LITHESK" Label service a place unique in the printing industry.

THE P.P. PRESS came into being in the year 1904, and under the managership of James Prescott, ably assisted by his brother Herman, set to work to produce colour printing to the highest and most exacting standards. Seldom can any publications have surpassed in printing quality and perfection that of "Bibby's Annual" or "The Bibby Calender"—two of the company's special productions.

In 1910 swift expansion called for the building of larger premises in King Edward Street, Liverpool, and later for the installation of a large department for lithography. In 1922 an additional factory was erected at Court Hey, specially designed and equipped for the manufacture of folding boxes and cartons on a large scale.

To-day, P. P. Press activities cover every kind of colour printing by all processes—letterpress, litho, photo-gravure—with special capabilities in handling work which requires delicate and difficult reproduction and fidelity.

AND NOW—Together under the name of Brown & Bibby Ltd. it is intended to carry on the traditions of fine workmanship and good service so firmly established by the two Companies—with grateful thanks to all who by their custom have made this step possible and in the confident hope that the many happy relationships of the past may be continued in a wider and happier future.

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LIMITED

Photo-Lithography • Letterpress • Folding Boxes

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TELEPHONE: ADVance 6755

WORKS: KING EDWARD STREET, LIVERPOOL 3 • COURT HEY, LIVERPOOL 16 • AINTREE, LIVERPOOL 9

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Vitaminise your Processed Foods with

●

Pure, dried, de-bittered Yeast in its most highly concentrated form

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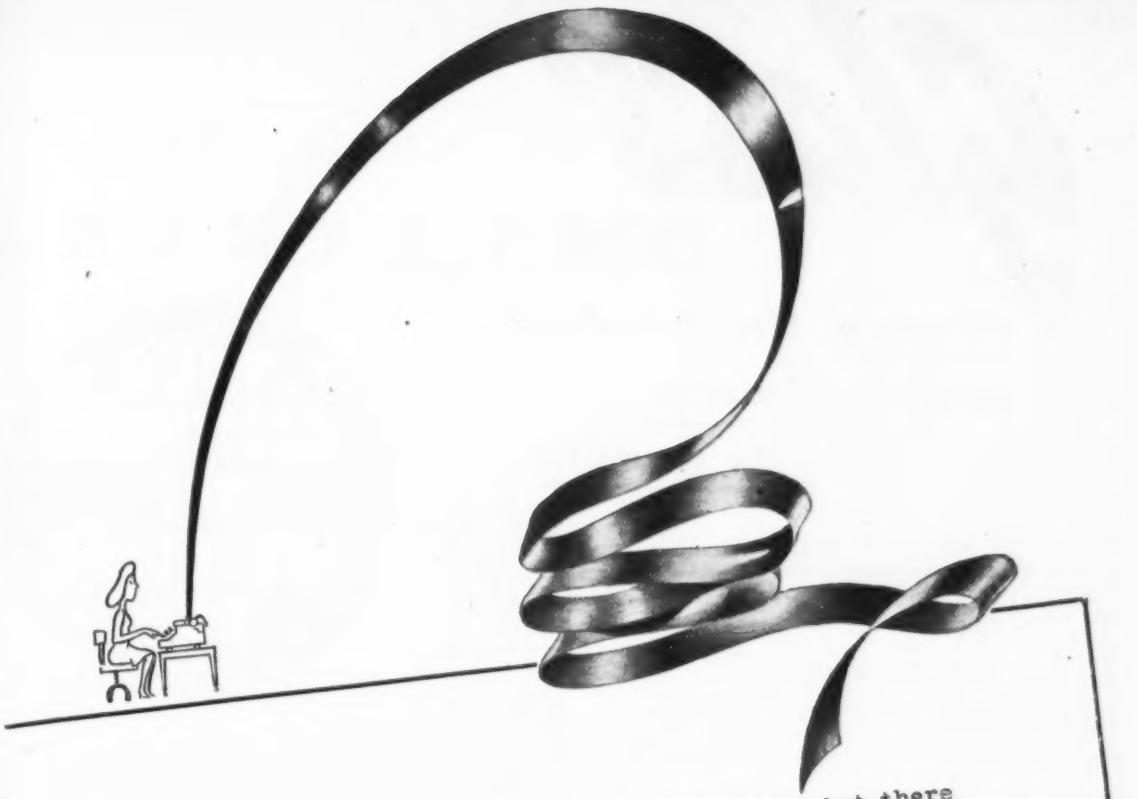
Rich in Vitamins B_1 and B_2

YESTAMIN

VITAMIN YEAST TABLETS

Yestamin greatly increases Food Value and adds an appetising piquancy to Taste. Write for full information and terms:

THE ENGLISH GRAINS CO. LTD.
BURTON-ON-TRENT



Dear Sirs,

Don't mention it, for enemy ears are listening, but there is a shortage of wood. The old happy days when crates and packing cases could lie around for weeks and then find themselves lighting the kitchen fire are ''gorn''.

There's another thing just in case you don't know. To-day lots of packers are unskilled. So how shall you get your packing done economically, quickly and effectively? How shall you make cases last longer and cartons do the work of wooden cases? And how shall you make sure that they will come back in good shape?

As if you didn't know! Seal-Less Strapping, of course. Beginners learn how to use the Seal-Less Machine in half-an-hour and once they've learned they can't go wrong.

By the bye, the demand for Seal-Less Machines has now grown to such an extent that we are having difficulty in keeping apace. Some of you Seal-Less users may have a smaller packing load than in peace time, i.e., you may be making different products (hush!). If you could look around and send us any Seal-Less Machines that you're keeping 'spare', we can put them to urgent national work. Thank you very much.

SEAL-LESS STRAPPING LTD., 19 SOUTHWARK STREET, LONDON, S.E.1. TELEPHONE: HOP 1661-2

CRC6

Glass CONTAINERS

display the product

and emphasize

its quality

YOUR CUSTOMERS SEE WHAT THEY BUY

★ Food Products have a more tempting appearance and consequently have a better sales appeal when packed in quality glass containers.

★ U.G.B. specialize in the manufacture of glass food containers. The registered trade mark U.G.B. embossed on the base is the "hall-mark" of quality, assuring clear crystal glass of great strength and accurate capacity.

★ Our design department is at your service when new packages are contemplated.

The immense manufacturing resources of the United Glass Bottle Manufacturers Ltd. are sufficient to supply the bottles and glass containers of a most varied description needed throughout the Empire.

UNITED GLASS BOTTLE MANUFACTURERS LTD

Largest Manufacturers of Glass Containers in Europe

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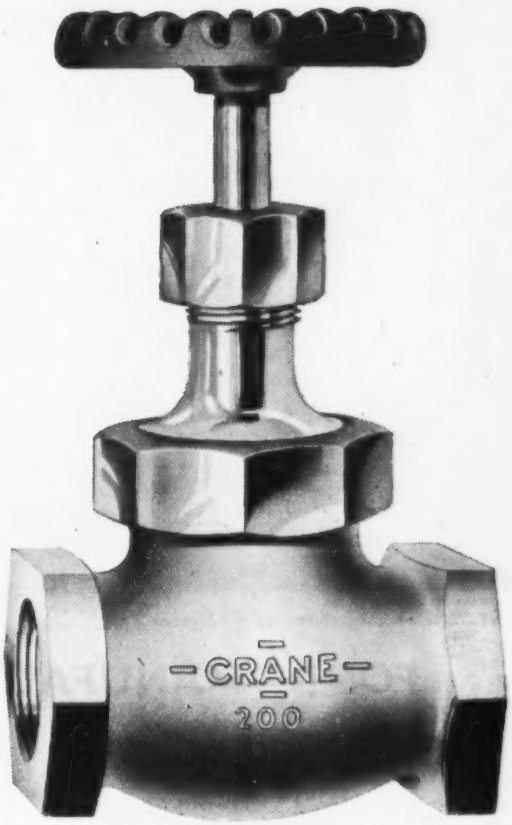
Telephone: Gerrard 8611 (10 lines).

Telegrams: "Unglaboman, Lesquare, London."

For quick Disc replacement and Economy



THE No. D.7 VALVE

Easy and swift replacement of discs is the distinguishing feature of the Crane D7 type Globe Valve—a valve suitable for many purposes. Thus, by avoiding prolonged hold-up of plant it is a real economy factor. For the rest it is made throughout with meticulous care, and is designed for steam pressures up to 200 pounds, and cold water, oil or gas non-shock up to 400 pounds.

CRANE

VALVES, FITTINGS AND HEATING EQUIPMENT

CRANE LTD 45/51 LEMAN STREET, LONDON, E.1
Branches at GLASGOW, BIRMINGHAM, BRISTOL, MANCHESTER.

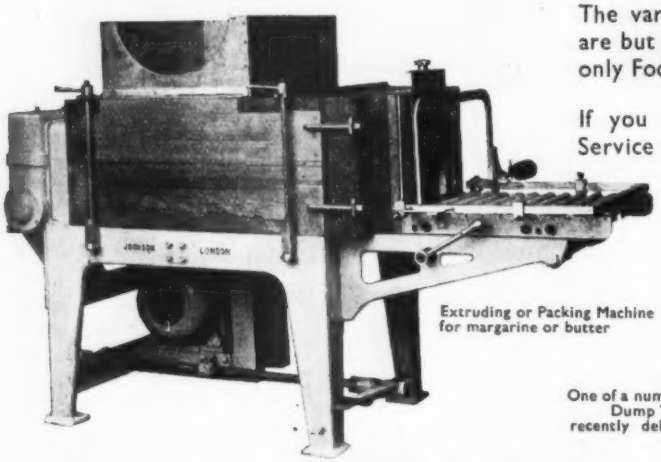
3,000 gallon Storage Tank nearing completion

STAINLESS STEEL

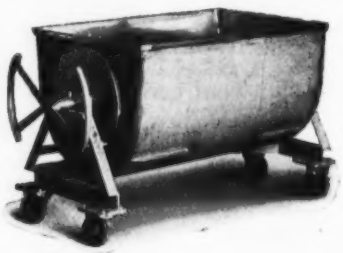
FOOD MANUFACTURING EQUIPMENT

The various types of Food Plant Equipment illustrated are but a few of the things we are making to help, not only Food Manufacturers, but also the National effort.

If you are engaged on essential work our Technical Service is at your disposal at all times.



Extruding or Packing Machine for margarine or butter

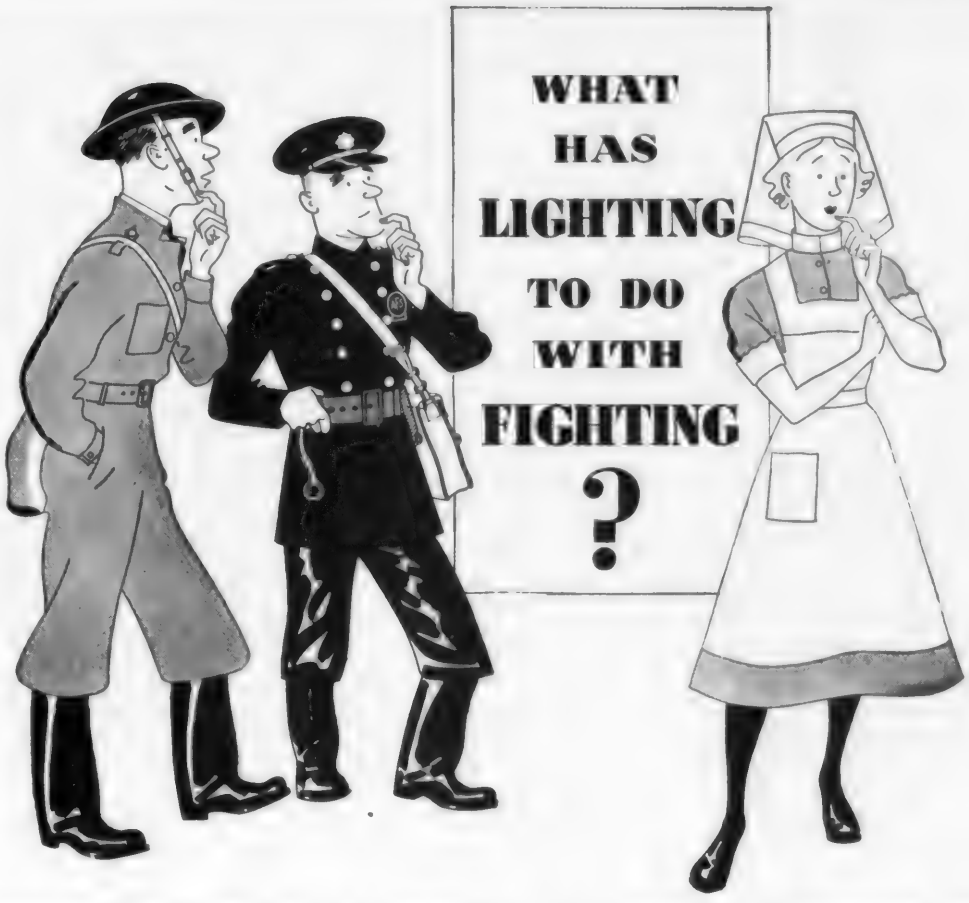


One of a number of Dump Trucks recently delivered

A. JOHNSON & CO. (LONDON) LTD.

AFRICA HOUSE, KINGSWAY, LONDON, W.C.2 Works: DUKE'S RD., ACTON, W.3

Coffee Percolators: part of an order for a well-known firm



WITHOUT CORRECT LIGHTING IN THE FACTORIES THAT SUPPLY THE SERVICES, OUTPUT MUST SUFFER.

Good lighting, so closely allied to production and the welfare of workers, is vital. If your installation needs better planning—or changes are required here and there to take care of new processes—or extensions are necessary—consult the G.E.C. Take advantage of the knowledge G.E.C. lighting specialists have gained in helping wartime factories towards full production.

Consult the G.E.C.

FOR ANY STANDARD OF ILLUMINATION

WITH

Osram Lamps and **Osram** Fluorescent Tubes

Advt. of The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2 I.E.8

AUSTERITY

is the Keynote in Canning today, as in so many other branches of our daily life. Tinplate gives place to Blackplate for certain packs—other packs are, alas! suspended "for the duration."

In these ever-changing days Holdens, as always, are ready to give up-to-the-minute advice on any aspect of Food Lacquer and Metal Box Varnish problems. Pin your faith to these tried and trusted old favourites.

SUPER ZINNATINE
Anti-acid, non-poisonous gold coating preserves the rich fresh colour and flavour of fruits.

SULFATINE,
The sulphur-resisting **ZINNATINE** prevents those blackening stains in vegetable packs.

AND ALLOW US TO INTRODUCE TO YOU A NEW FRIEND -

N°1736 DEEP STAMPING GOLD LACQUER *for* BLACKPLATE & GENERAL PURPOSE WORK....

ARTHUR HOLDEN & SONS LIMITED

THE PIONEER LACQUER MANUFACTURERS

BIRMINGHAM

A name to conjure with

One has to be something of a magician these days to meet all the varying demands on an organisation already hard pressed by the requirements of the national effort.

Still, though we cannot produce Glucose out of the proverbial "top-hat," we are doing all in our power to retain the good-will built up over many years by persistent research, efficient manufacturing technique and good service.

NOTE NEW ADDRESS:

● **CORN PRODUCTS COMPANY LTD., INGERSOLL HOUSE, 9 KINGSWAY, LONDON, W.C.2**

DOUBLE SEAMING

Friction Rings being attached to 1 Quart Paint Cans.
Output—150 per minute, on our No. 51 Ten-Spindle
Automatic Rotary Seamer.

CAMERON
CAN MACHINERY CO.
240 North Ashland Avenue
Chicago U.S.A.

MINISTRY OF SUPPLY

BRITAIN URGENTLY NEEDS RUBBER

Your worn-out TYRES, TUBES, BELTING, RUBBER LINED FITTINGS are wanted to help replace lost sources of supply — now!

The enemy now holds 90% of the world's natural rubber resources. That is why every scrap of rubber lying useless and discarded all over the country is wanted for war purposes—at once! Organise a ruthless search — indoors and out — for waste rubber. Keep it up, week after week, until the war is won. Do more. See that from now on, you and everyone in your employ economise in the use of rubber; *that not a scrap is ever wasted, thrown away or burnt.*

CHECK OVER THIS LIST

Here is a number of important items made of rubber. Check them over when you are searching out your waste rubber for salvage.

Aprons - Belting - Buffers - Bungs - Castors

Conveyors - Drying rollers - Engine mountings

Finger dampers - Flexible piping - Flooring

Gloves - Hose - Jointings - Mats - Packings

Pump linings - Sheeting - Shock absorbers

Stair treads - Tap fittings - Tyres & Tubes

Tubing - Valve linings and seatings - Vibration dampers - Washers - Wheels (rubber-tyred)

HOW TO HAND IN YOUR RUBBER

1 WORN-OUT TYRES & TUBES. Take them to a local garage for dispatch to an Official Government Depot; if unable to do so, put them out for collection by the Local Authority.

2 OTHER WASTE RUBBER. Put it out for collection by the Local Authority; or if you have a large amount for disposal you may sell it to a Merchant. If you don't know the nearest Merchant's address, write to **Rubber Control, (W.R.), Empire House, St. Martin's le Grand, London, E.C.1.**

3 If you accumulate more than one ton, you can arrange for a *special collection* by getting in touch with the nearest Demolition and Recovery Officer. If you don't know his address, write to **The Ministry of Works and Buildings, Lambeth Bridge House, Albert Embankment, London, S.E.1.**

HAVE YOU APPOINTED AN INDUSTRIAL SALVAGE STEWARD? Salvage is of such vital and increasing importance that it should be made the personal responsibility of one particular individual in every organisation. Appoint your own Industrial Salvage Steward and put him in sole charge of an intensive and continuous drive for

STILL MORE SCRAP METAL, PAPER, KITCHEN WASTE, BONES, RAGS — AND RUBBER

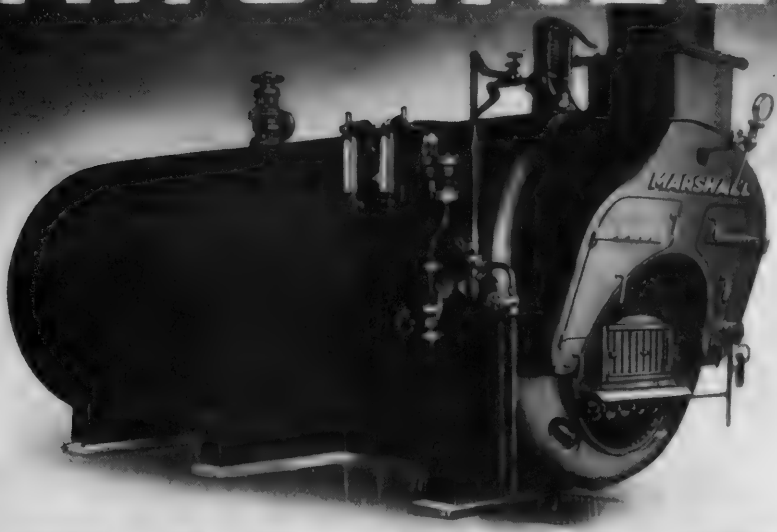
CONQUEST OF PAIN

IT may at first seem a far cry from the chemical factory to the hospital operating theatre. Here is a modern surgical operation in progress. The picture was painted in an operating theatre at St. Mary's Hospital, London. The chief interest in it must naturally centre in the figures of the surgeon and the patient, whose form is no more than suggested on the operating table. Yet it is appropriate that the anæsthetist with his trolley should occupy such a prominent place, for surgery as it is known today dates from the discovery of practical methods of anæsthesia. The power to produce insensibility to pain has enabled the surgeon to achieve his miracles. Less than 100 years ago surgery was a dire last resort and a brutal business, the patient having either to be tied down or drugged with quantities of alcohol. In 1846 ether was used as a surgical anæsthetic by Dr. Warren in the U.S.A. In the following year chloroform was used in Edinburgh by Dr. (later, Sir James) Simpson, who was denounced from the pulpit for interfering with the works of God ! To-day anæsthesia is a highly specialised branch of medicine, employing a large and constantly increasing number of chemicals. Of these some are inhaled through a mask, some are injected into a vein, and some are infiltrated into the tissues. Some give complete anæsthesia, others varying degrees of local anæsthesia only. Ether and chloroform are still used, but modern chemical research has made available special anæsthetics for all purposes. Some anæsthetics are derived from the normal products of chemical factories. Ether is made from sulphuric acid and alcohol, and chloroform from bleaching powder and alcohol or acetone: cyclopropane and trichlorethylene are also relatively simple substances and are easily made, though skill and experience are necessary to produce all these in a high state of purity. Other anæsthetics, such as those of the barbituric acid group, are far more complex and their manufacture is made possible by the skill, resource and research of the British organic chemist. In the field of anæsthetics, British chemical factories and research laboratories stand behind the faculty of medicine to make available better and safer chemicals for the conquest of pain.

ICI

Imperial Chemical Industries Limited, London, S.W.1

MARSHALL



BOILERS

BUILT BY CRAFTSMEN
UTILISING MODERN
EQUIPMENT AND THE
HIGHEST QUALITY
BRITISH MATERIALS

MARSHALL SONS & CO
(SUCCESSORS) LTD. GAINSBOROUGH.
TELEPHONE GAINSBOROUGH 280.

B.4414

NATIONAL CONCENTRATED FOODS

PROTEX

A Concentrated Extract with high Amino Acid content. Manufactured by Fredk. Boehm Ltd.

As a base, incorporated in foodstuffs, PROTEX has been accepted as a standard ingredient by the leading food manufacturers and is valued chiefly for its power of enhancing the characteristic flavour of almost any food preparation.

YEATEX

A Yeast Extract manufactured by the Trent Yeast Extract Co., Ltd., from Brewers' Yeast. Rich in Vitamin B. A most highly concentrated food, easily digested with the highest nutritional and health value. Possessing a pleasant aroma and flavour.

Sales Offices:

FREDK. BOEHM LTD.

ROWANHURST, GROVE ROAD, BEACONSFIELD, BUCKS

Telephone: Beaconsfield 378

WISDOM SUGGESTED *Aluminium!*

Before the war, considerable progress had been made in the use of aluminium in marine construction. Lifeboats, davits, superstructure and equipment were being produced from specially developed corrosion-resisting aluminium alloys notable for their lightness and great strength. The high strength-weight ratios of these alloys helped naval architects to solve the fundamental problem of reducing weight without sacrificing strength or safety. Research, which produced in aluminium alloys the properties necessary for such vital duty, has enabled the metal to meet the most stringent requirements for wartime uses. This work, now diverted to current applications, continues. Government contractors using aluminium are invited to discuss their problems with our Research and Development Department.

NORTHERN ALUMINIUM COMPANY, LIMITED · HEAD OFFICE: BANBURY, OXFORDSHIRE

British Manufacture Throughout

Tinplates and Blackplates

The Baldwin range includes a branded Tinplate for every purpose. These Tinplates are STANDARD brands regularly used in all parts of the world for every kind of canning and deep stamping work.

As the original makers of Open Hearth Siemens Basic Steel with complete control of materials from iron ore to finished product, Baldwins are able to offer exceptional advantages to users of Tinplate.

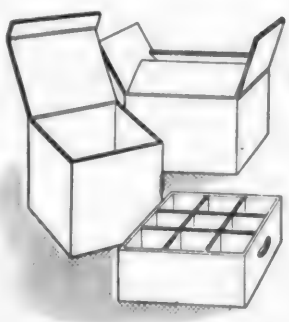
Strictly competitive prices for all grades and qualities quoted on request.

Baldwins Ltd.

Registered and Head Office : P.O. Box 255, 4 Broadway, Westminster, London, S.W. 1
Telephone : Abbey 1853. 'Grams : "Baiwinza, Rand, London."
Cables : "Baiwinza, London."
South Wales Branch and Collieries Office : 45 Wind Street, Swansea
'Phone : Swansea 4941 (8 lines). 'Grams : "Baldwins, Swansea."
London Sales Office : P.O. Box 255, 6 Broadway, Westminster
'Phone : Abbey 1853. 'Grams : "Promptitude, Rand, London."
Cables : "Promptitude, London."
On Admiralty, War Office, Air Ministry, Board of Trade, Lloyds, British Corporation and other lists.

The Village Green

We long for the restful quiet of the village green when the song of the lark is no longer drowned by the roar of aircraft. We shall enjoy again the peaceful countryside undisturbed by the seemingly endless motor convoy. This prospect gives us encouragement to-day, and we look forward to the time when the Medway Organisation will be catering once more for the manufacturers of those products which have been denied the public during the war-time period.



MEDWAY

CORRUGATED CASES

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BOIL IN THE MODERN WAY

LET THE

"KELLIE" Extra-Rapid Jam Boiling Pan help you

Used in conjunction with our latest Automatic Pan Charging Plants the output per Boiling Pan will easily reach 4 tons per day of 9 hours.

General view of a typical Jam Boiling Department, showing arrangement of KELLIE Extra Rapid Boiling Pans, also Steam Exhausting Arrangements.

As pioneers and inventors of the "Kellie-Yates" Juice and Pomace preparing, extracting and filtering, distributing, charging and boiling plants we offer clients unrivalled technical and practical advantages based on our accumulated knowledge and experience and many years' active research work. Over 90 complete installations are now in operation in preserve factories throughout the world producing high-class preserves of finer flavour and greater clarity at a fraction of their former manufacturing costs.

LET US SEND YOU ILLUSTRATED LITERATURE. YOU'LL BE INTERESTED

ROBERT KELLIE & SON, LTD.

THE DUNDEE FOUNDRY **DUNDEE**

MAKERS OF FOOD PREPARING & CANNING MACHINERY & PLANTS

Telegraphic and Cable Address: "KELLIE," Dundee. Telephone: 2819 (3 lines)

Manchester Representative: A. E. FIELDING, Queen's Chambers, 2, Ridgefield, Manchester. Telephone: Blackfriars 0449.

100 YEARS OF SUSTAINED SERVICE

It was in 1841 that the House of White, Tomkins and Courage Ltd. was established.

★ ★ ★ ★

Today the business is pre-eminent in its field; it having been built up by supplying the highest quality goods at reasonable prices.

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Large Mills and Factories are established in LONDON, LIVERPOOL, BELFAST, TANDRAGEE and REIGATE.

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The business in ESSENTIAL OILS, ESSENCES, FLAVOURINGS AND HARMLESS FOOD COLOURS is conducted from North Albert Works, Reigate.

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In peace and war the best possible service is given to the Trade by

WHITE, TOMKINS & COURAGE, Ltd.

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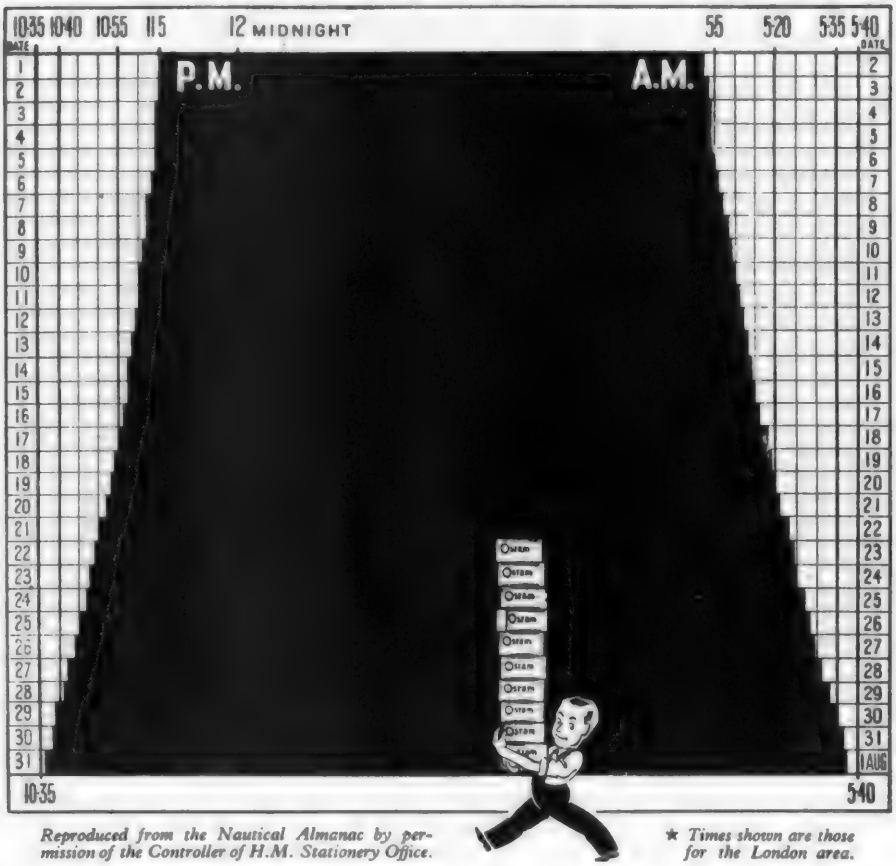
REI GATE

The Time to Plan . . . .

BLACK-OUT CHART FOR JULY



MOON PHASES

LAST QTR. SUN. 5TH.

NEW MOON MON. 13TH.

FIRST QTR. TUES. 21ST.

FULL MOON MON. 27TH.

Reproduced from the Nautical Almanac by permission of the Controller of H.M. Stationery Office.

★ *Times shown are those for the London area.*

Summer it may be, but black-out hours are lengthening again. It is time to think of lighting and how best it can be applied to assist output during the still darker months. Does your lighting system need any revision? . . . If so, complete your plans in good time. The subject of lighting always brings Osram to mind — for wherever you find good lighting, there you will find OSRAM.

Osram

A G.E.C. PRODUCT

THE WONDERFUL LAMP

Advt. of The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2

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With Sarco Control there is NO time lag, no possibility of error. Temperature fluctuations are communicated directly and instantly to the valve, instead of through the thermometer . . eyes . . brain . . muscles . . . And the skilled operator can be transferred to other important work.

SARCO CONTROL

F.14

Please send particulars of Thermostatic Control in its application to Food Storage · Refrigeration · Canning Process Ovens · Drying · Jacketed Pans · Mixing · Direct Water Heating

NAME .....

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SARCO THERMOSTATS LTD., ALPHA HOUSE, CHELTENHAM, GLOS.
LONDON OFFICE: 28 VICTORIA STREET, S.W.1. ABBey 2101

FREEDOM AND FRESH AIR . . . . !

The ATLANTIC CHARTER

The heads of two great nations meet, and a common ideal of faith is indissolubly welded to stand as a beacon of hope to all oppressed peoples. We are fighting for the realization of that ideal, which includes the right of every man to his natural heritage of living and working in harmony and comfort, unfettered, unhindered . . .

To us of ALAND, these noble phrases have a familiar ring. By virtue of the products we make, it always has been our specific aim to improve working conditions in industrial and commercial buildings for the better comfort and convenience of the workers. That Ventilation by ALAND should also result in increasing efficiency and, thereby, production, is almost incidental, although naturally gratifying to all those practical business people who now and in the future use ALAND FANS!

THE ALAND ADVISORY SERVICE
is always available to help with Ventilation and Dust or Fume Extraction problems, or to co-operate with your Consulting Engineer. We regret that we can only supply equipment during wartime on Government Contract orders.

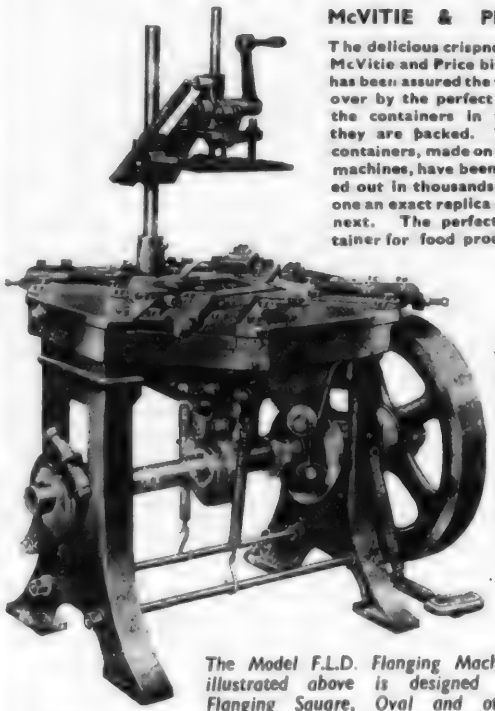
VENTILATION
Aland Fans
DUST OR FUME EXTRACTION

THE AIR OF EFFICIENCY!

ALAND FAN COMPANY
(ALAND & CO. LTD.)
SO. CLAPHAM ROAD, S.W.9 - RELIANCE 1306
Est. 1864

Greenwood

Famous CONTAINERS



McVITIE & PRICE

The delicious crispness of McVitie and Price biscuits has been assured the world over by the perfect fit of the containers in which they are packed. These containers, made on Moon machines, have been turned out in thousands, each one an exact replica of the next. The perfect container for food products.

The Model F.L.D. Flanging Machine illustrated above is designed for Flanging Square, Oval and other Irregular-shaped Bodies in readiness for double seaming.

The flanging motion is unique and independent of the automatic slide movement, occurring only after the body has been trued to shape and gripped, it produces a perfectly level flange with a complete absence of "pips" at the side joints.

The machines are treadle operated through a non-repeat, dual-sprung, rocking key clutch, and are safe and easy to work.

Change-over from size to size is simple and speedy, as every set of tools supplied is fitted with adjusting plates giving instant location.

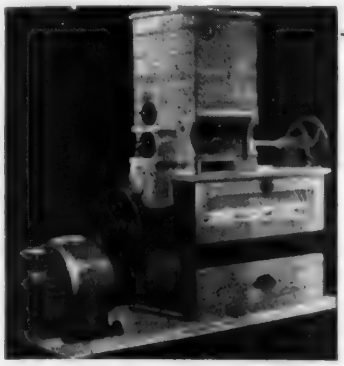
Made on Machines by

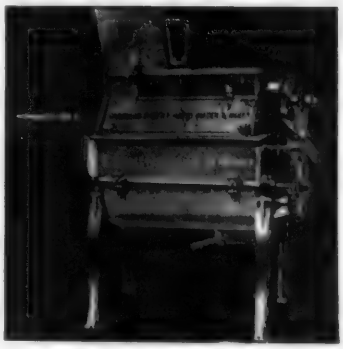
MOON

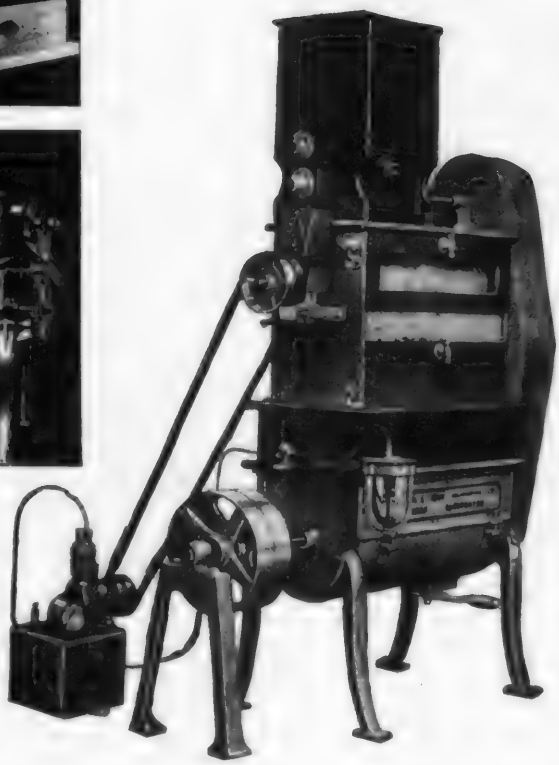
MOON BROTHERS LIMITED, BEAUFORT ROAD, BIRKENHEAD
Makers of Tin Box and Drum-Making Machinery

dm 750

THESE WORKMEN PAY THEIR OWN WAGES







This Gardner combined patent Fine Powder Dresser, "Rapid" Mixer and patented Sprayer (illustrated on right) embodies new type air compressor and spray which gives results far surpassing anything previously achieved. Full information about any Gardner machine will be sent on request.

Many customers have told us that Gardner Patent "Rapid" Sifters and Mixers and Powder Dressers soon pay for themselves.

The machines we illustrate will enable you to produce any powdered foodstuff, blended to perfection and free from all oversize particles, grits, lumps, fibre and similar impurities. The products of these machines will be powders of the finest texture, equalling in perfection of mixing, uniformity of colour, flavour or aroma, the best known products of their kind.

All are easily cleaned and may be used to make many widely different products in quick succession.

Write for full particulars NOW

GARDNER'S

SIFTING, MIXING & SPRAYING MACHINES

WM. GARDNER & SONS (GLOUCESTER) **LTD., BRISTOL ROAD, GLOUCESTER**

Telephone: 2288 (3 lines) *Telegrams: "Gardner, Gloucester."*

LONDON: 19 Grays Inn Chambers, 20 High Holborn, W.C. 1 *Telephone: Chancery 7347*

GOLD!

A crude wooden framework with a canvas lining—such was the "rocker". The bed and sediment of the stream was shovelled in, and a rocking motion combined with the flowing water removed the "dirt", leaving perhaps a few grains of gold in the bottom, to join the slowly accumulating pile in the little sack.

Fortunes were made with such simple apparatus—in 1849; but in 1942, if the source of your wealth is in any way dependent on a filtered product, you had better consult . . . .

BRITISH FILTERS LIMITED

AIRCRAFT HOUSE, MARKET HARBOROUGH

BISCUITS THIS TIME!

Typical of many fine Cochran installations in food factories. This time it is the biscuit works of F. E. Fox & Sons, Batley. A 4 ft. 9 ins. dia. by 12 ft. 3 ins. high Cochran Boiler fitted with "Iron-fireman" automatic Stoker giving 1,030 lbs. of steam per hour. (Easy Steaming from Cold Feed.)

TAS/CH.186

COCHRAN

Cochran & Co., Annan, Ltd., Annan, Scotland,
And at 32, Victoria Street, London, S.W. 1

AERATION & PHOSPHATES

IBEX ACID CALCIUM PHOSPHATE 80% for the Self-raising and Cake Flour Manufacturer.

ANTELOPE

ACID SODIUM PYROPHOSPHATE reduced to Cream of Tartar strength for the Baker.

PURON

ACID SODIUM PYROPHOSPHATE Full Strength: for the Baking Powder Manufacturer.

The use of Phosphates for aeration is not a "Wartime" innovation nor can they be regarded as "substitutes." When the well-known brands of IBEX, ANTELOPE and PURON were first introduced by Albright & Wilson they came to stay. The Milling and Baking trades have been using these high grade Food Phosphates for the Chemical Aeration of Foodstuffs for over a quarter of a century; now they have become recognised as Standard Products. Established Manufacturers of Baking Powder, Cake and Packet Flours are invited to communicate with the Technical Service Department of Albright & Wilson on any problem relating to aeration.

ALBRIGHT & WILSON LTD

ESTABLISHED 1844

OLDBURY, Nr. BIRMINGHAM

Sales Office: Park Hall, Kidderminster, Worcestershire

SUPERFINE SOYA FLOUR

An .. Arkady *Product*

The Soya Bean has been called "The Magic Bean" because it has so many uses — but no single Soya bean preparation will serve every purpose. Our slogan has always been "THE BETTER LOAF" and Bread has always been our chief job; therefore we concentrated on producing a Soya Flour especially for Bakers.

Our Superfine SOYA FLOUR for Bread

1. Improves the sheen on the crumb and bleaches the colour.
2. Mellows the dough — making it easier to mould.
3. Gives a moister and more velvety crumb.
4. Improves the keeping qualities of the bread.

You Just try it and See!

THE BRITISH ARKADY CO. LTD.
SKERTON ROAD · OLD TRAFFORD · MANCHESTER 16

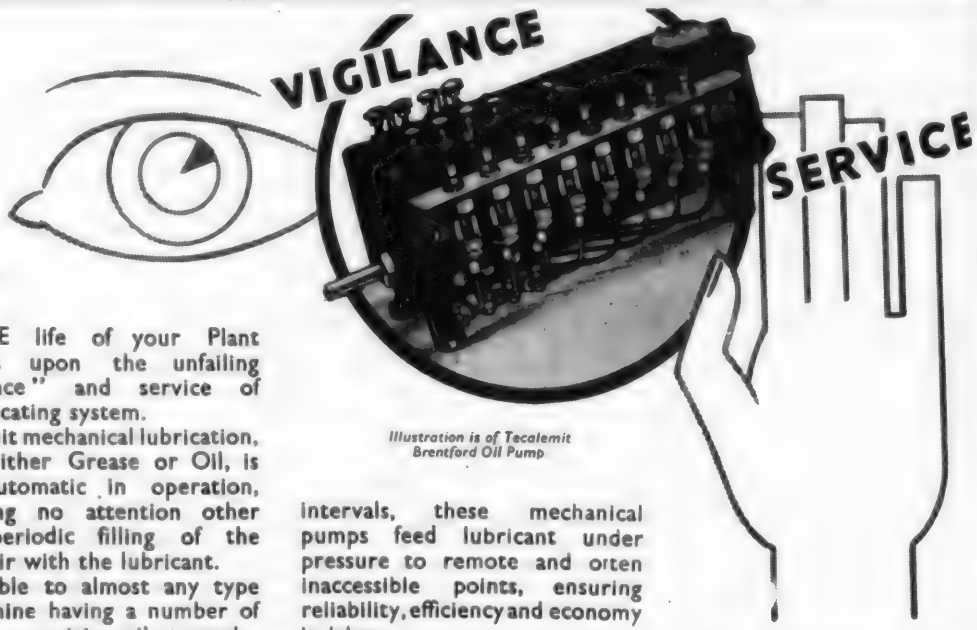


Illustration is of Tecalemit Brentford Oil Pump

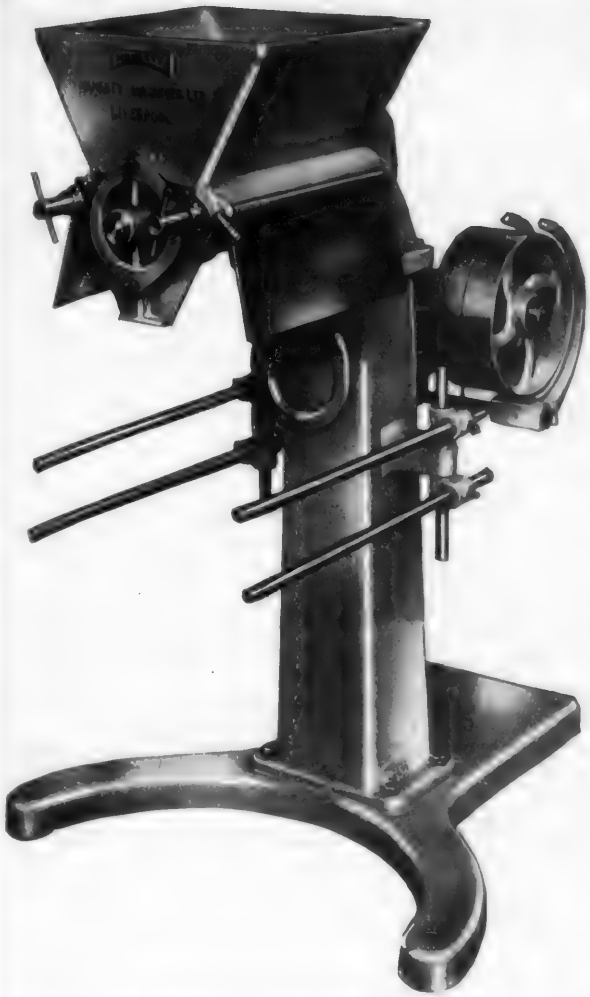
THE life of your Plant depends upon the unfailing "vigilance" and service of its lubricating system.

Tecalemit mechanical lubrication, using either Grease or Oil, is fully automatic in operation, requiring no attention other than periodic filling of the reservoir with the lubricant.

Applicable to almost any type of machine having a number of bearings requiring oil at regular intervals, these mechanical pumps feed lubricant under pressure to remote and often inaccessible points, ensuring reliability, efficiency and economy in labour.

MECHANICAL LUBRICATION by TECALEMIT

TECALEMIT LIMITED, GREAT WEST ROAD, BRENTFORD, MIDDX. Phone: EALing 6661 (12 lines)



MANESTY

OSCILLATING GRANULATOR

THE Manesty Oscillating Granulator was introduced originally to help manufacturers of large quantities of tablets in the granulation of their material. Formerly done by hand, it was found that this machine did the work of four to six operators.

The Manesty Oscillating Granulator has many uses other than preparing material for tablet making, and we are now supplying a number to the Food Industry. This machine turns out granules of uniform size, its output is about 150 lbs. per hour and it thus very greatly reduces time and labour costs. It consists of a suitably geared oscillating stainless steel rotor which operates over a stainless steel wire screen. These screens are instantly interchangeable, depending on whether coarse or fine granules are required. Three stainless steel wire screens are provided with each machine—8, 10 and 12 mesh.

For the preparation of granules from powdered material the Manesty Oscillating Granulator is undoubtedly the most efficient and economical machine yet devised, and it can also be used for obtaining granules from lumpy or crystalline materials.

●

SAVES LABOUR, SPEEDS UP WORK, TURNS OUT BETTER GRANULES

SPECIFICATION

Height	4 ft. 2 ins.
Floor Space	39½ ins. × 32 ins.
Pulleys	10 ins. × 2 ins.
Capacity :	
Moist Material	150 lbs. per hour (approx.)
Dry	600 lbs.
Speed	480 r.p.m.
Power required	1 h.p.
Lubrication	Grease gun
Weight, Net	311 lbs.
,, Gross	500 lbs.

BRITISH MADE THROUGHOUT

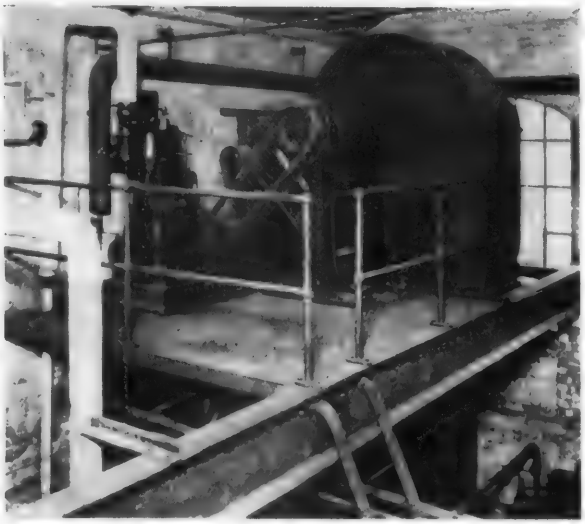
Please send for full particulars

Made by **MANESTY MACHINES LTD.**

4a SPEKE HALL ROAD LIVERPOOL 19

Telegrams : MANESTY, LIVERPOOL

Telephone : HUNTS CROSS 1321



A Sturtevant Induced Draught Installation.

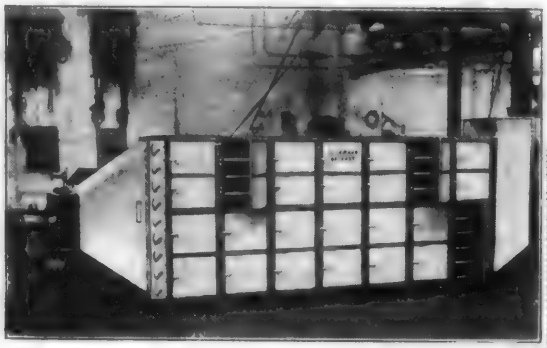
Get the best out of your Boiler Fuel

INSTALL STURTEVANT MECHANICAL DRAUGHT

We are specialists in Forced and Induced Draught equipment, and can help you solve your combustion problems. Sturtevant Mechanical Draught Systems are described and illustrated in our post-free publication, W1077A.

STURTEVANT ENGINEERING CO. LTD.

25 WORCESTER ROAD, SUTTON, SURREY



FOR ALL CLASSES OF

DRYING EQUIPMENT

Compartment Dryers
Tunnel Dryers
Conveyor Dryers
for all materials

Specialists in the design and construction of all types of Dryers, our wide experience is at your disposal. Let us advise you as to the most efficient and economical plant suitable for your own particular purpose. The illustration shows a Musgrave Cupboard Dryer for Confectionery.

Musgrave *and Company Limited*

Prettenham House, Lancaster Place, London, W.C.2
BELFAST · GLASGOW · MANCHESTER · BRISTOL · CARDIFF

Prodorite Acidproof Floorings

will overcome YOUR problems

A special type of flooring is needed to resist the unavoidable spillage of acid and at the same time withstand heavy wear over a long period of time.

We have had exceptionally extensive practical experience in providing Acidproof Floors for all Industries and this experience is at your service.

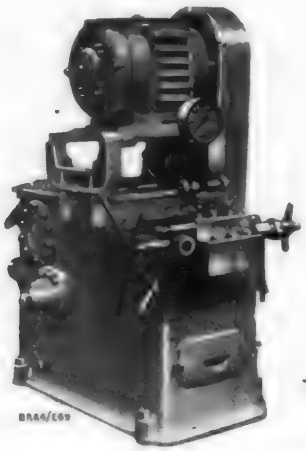
A Prodorite Floor is an excellent investment and estimates will be given for laying by our own contracts department or for laying to be undertaken by builders and contractors and maintenance staffs where practicable.

EAGLE WORKS
WEDNESBURY, Staffs
Phone: WEDnesbury 0284
(Private Branch Exchange)

PRODORITE LTD

ARTILLERY HOUSE
ARTILLERY ROW
LONDON, S.W.1
Phone: ABBey 1547 & 1548

HOMOGENISATION
Improves Food Products



The use of substitutes in processed food is unavoidable to-day. The problem of the manufacturer is to maintain the "Appeal to the Palate" and improve the keeping quality. You can do this with

BRUSH

HOMOGENISERS

Write for Publication F.M.E. 66

THE BRUSH ELECTRICAL ENGINEERING CO., LTD.,
LOUGHBOROUGH, ENGLAND

5-38

What a difference...

WARTIME MAKES TO EVERYTHING!

Supplies of all kinds are limited, including Pectin. Our efforts, as always, are firstly directed to maintaining the unvarying quality of "ELPEX," and while we are producing also a greater tonnage, there is still sometimes a margin between production and extra war demand. We do not anticipate having to make such a definite announcement as illustrated above.

WM. EVANS & CO. (Hereford & Devon) LTD.,
20 WIDEMARSH, HEREFORD. **Est. 1850.**

Elpex
APPLE PECTIN

B.W.7/42/B.

We serve those who—

also stand and serve

If you want the best

Tea and Coffee Making Apparatus • Canteen Boiler • Silver Burnishing Machine • Dish Washing Machine • Hot Closet and Carving Table Potato Peeler • Bread Slicer • Tea Measuring Machine • "Metropole" Toaster and Griller Steam Cooker Automatic Glass Rinser

then it MUST be a product of

How many

beans make five is problematical, but the answer to how many cups of tea can be had in ten minutes is a definite reality when using the 'STILL' Canteen Boiler. In one hour, this Boiler produces 90 gallons of absolutely boiling water and, with the Steam Heated Model, has an initial draw-off of 30 gallons in 10 minutes, sufficient for 500 cups of tea.

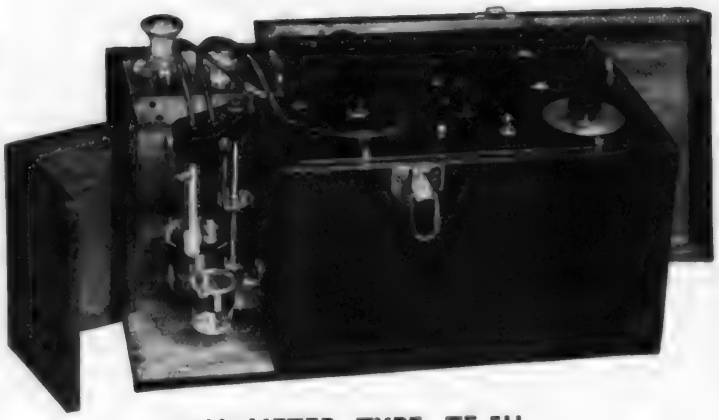
W. M. STILL & SONS LTD.

Creators of Modern Kitchen Equipment

29-31 GREVILLE STREET LONDON. E.C.1.

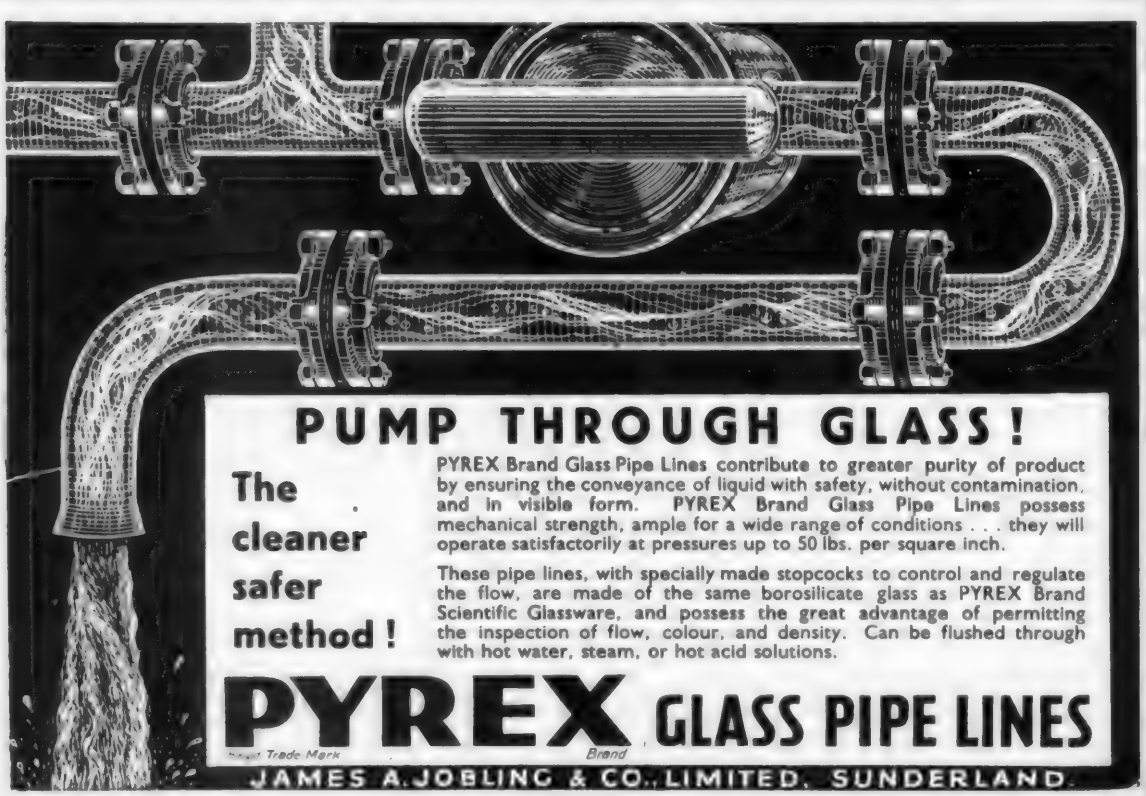
TELEPHONE HOLBORN 3744 (6 LINES) . . . TELEGRAMS: METALSPINNER, LONDON.

The Battery Operated pH Meter Type TF.511 here illustrated has been designed for the laboratory or works where mains supplies are not usually available, or where the number of tests taken do not warrant the installation of our mains operated models. This instrument is ideal for the mobile laboratory where speedy and accurate results are essential. The range is 0-14 pH and accuracy 0·02 pH. Completely self-contained with Dip Type Glass Electrode System. Long life batteries and absolute stability.



pH METER TYPE TF.511

MARCONI INSTRUMENTS LTD., ST. ALBANS, HERTS. Tel.: 4323



PUMP THROUGH GLASS!

The cleaner safer method!

PYREX Brand Glass Pipe Lines contribute to greater purity of product by ensuring the conveyance of liquid with safety, without contamination, and in visible form. PYREX Brand Glass Pipe Lines possess mechanical strength, ample for a wide range of conditions . . . they will operate satisfactorily at pressures up to 50 lbs. per square inch.

These pipe lines, with specially made stopcocks to control and regulate the flow, are made of the same borosilicate glass as PYREX Brand Scientific Glassware, and possess the great advantage of permitting the inspection of flow, colour, and density. Can be flushed through with hot water, steam, or hot acid solutions.

PYREX Registered Trade Mark Brand GLASS PIPE LINES

JAMES A. JOBLING & CO., LIMITED, SUNDERLAND.

CHIEFTAIN

PRODUCTS OF INTEREST TO FOOD MANUFACTURERS

The famous 'Chieftain Trade Mark—symbol of Quality, Reliability and Usefulness in Food Products.

★ *For Samples and full Details get in touch with:—*

BRITISH FERMENTATION PRODUCTS LTD.,

Chieftain Works, London, S.W.15.

Ipswich and Depots throughout the U.K.

SCROLL-TYPE DUST COLLECTOR FANS

The Howden scroll-type dust collector combined with a Howden induced draught fan removes the grit from flue gases efficiently and with low power consumption.

The photograph shows a unit driven by a Howden high speed engine, well known and appreciated both by marine and land engineers.

HOWDEN

JAMES HOWDEN & CO. (LAND) LTD.
195 SCOTLAND STREET, GLASGOW

EVERY UTENSIL AND CONTAINER

A Dawson Utensil and Container Cleaning Hydro can be constructed for washing tins, jars, bottles, moulds, trays, baking boards, mixers, basins, bowls, buckets or any other equipment used in Food Industry. Suggestions and specifications will be supplied in response to enquiries stating type of articles to be cleaned.

Dawson JAR AND BOTTLE *washing machines*

are installed by many leading Dairies, Breweries and food packers throughout the country for high speed washing of large quantities of bottles and jars of all sizes and types. Outputs up to 1,000 dozens per hour. Machine for washing and drying small glass jars is illustrated. Output 7,000 per hour.

DAWSON BROS. LTD.

Head Office and Works:
VENTNOR WORKS, GOMERSAL, LEEDS.
Telephone: Cleckheaton 265 (2 lines).
London Address:
Roding Lane, Southend Rd., Woodford Green, Essex.
Telephone: Wanstead 0481.
Established 1864.

A rose by any other name would smell as sweet, but when specifying lighting the name Benjamin makes all the difference. Benjamin stands for unique lighting service specialising in industrial illumination ; it stands for the finest equipment, experience over thirty-three years, and a team of lighting engineers covering the whole country. Benjamin stands for lighting planned to ensure the best seeing conditions for every individual in your works.

BENJAMIN LIGHTING

The Benjamin Electric Ltd., Brantwood Works, Tottenham, London, N.17.

Telegrams : "Benjalect, Southtot, London." Telephone : Tottenham 5252 (5 lines). 1144

BREHMER'S

CONTAINER WIRE-STITCHER, No. 57½

This machine serves for wire stitching the bottoms of single piece corrugated or solid board containers. The pillar type Anvil has 30-in. maximum reach and suffices for firmly fastening the bottom flaps with wire stitches automatically formed, driven and clinched from a reel of Ribbon Stitching Wire 12 by 25 or 12 by 26 gauge. An interchangeable top stitching tongue with adjustable work-table can also be supplied for wire stitching, also the tops of the filled containers in place of taping. Supplied in three styles, viz.: For Treadle use, Line-shaft drive, or self-contained direct motor drive. Speed to 150 stitches per minute.

PARTICULARS OF THIS AND OTHER BRITISH-MADE BREHMER WIRE-STITCHERS on application to:

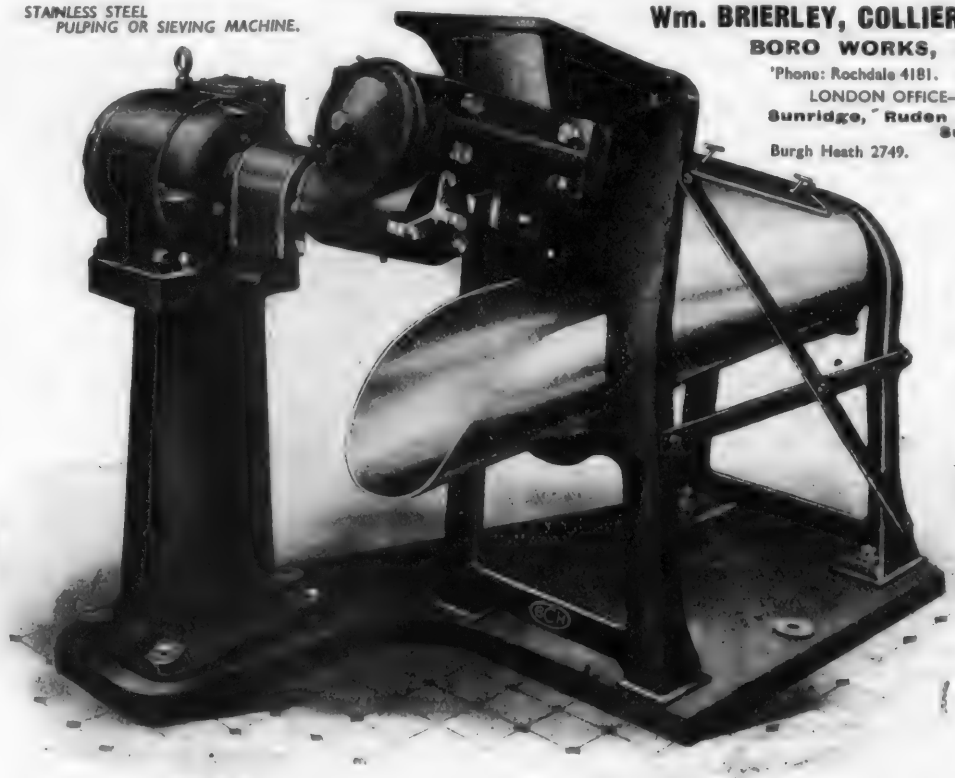
AUG. BREHMER'S (BRITISH) SUCCESSOR LTD.

Offices:

Batchworth House, Harefield Road, Rickmansworth, Herts.

Telephone and Telegrams: Rickmansworth 3413

STAINLESS STEEL PULPING OR SIEVING MACHINE.



Wm. BRIERLEY, COLLIER & HARTLEY LTD.

BORO WORKS, ROCHDALE

'Phone: Rochdale 4181. 'Grams: "Bricohar, Rochdale."

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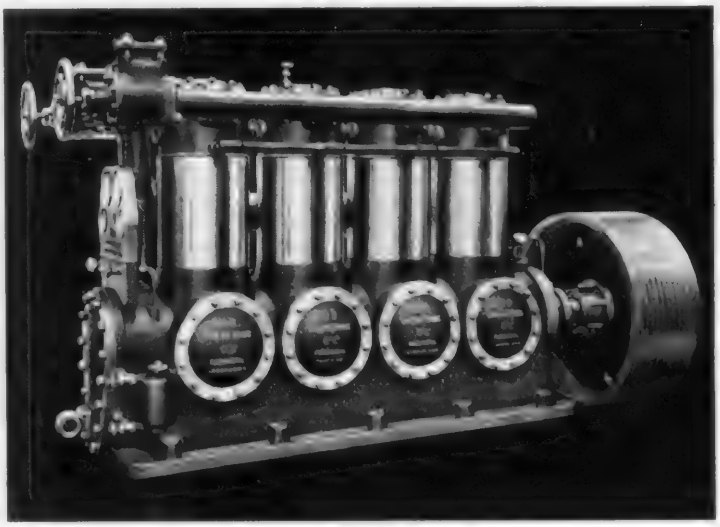

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FOOD MANUFACTURE

Vol. XVII. No. 7 · Published Monthly · July, 1942

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Special Meat Products Number

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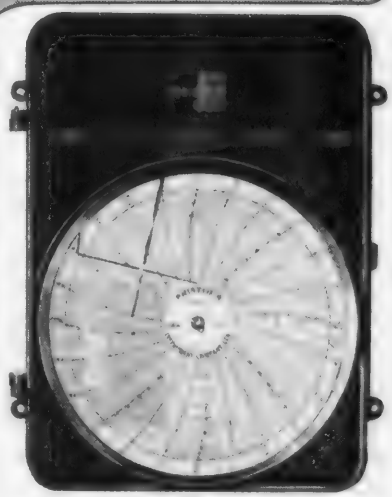

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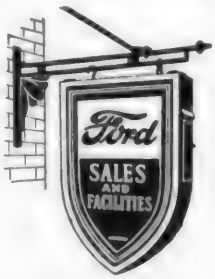

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FOOD MANUFACTURE

Vol. XVII, No. 7 July 1, 1942

Meat as Food

THE fifth meeting of the series "The Nation's Food", organised for the Food Group by its Nutrition Panel, took place on April 29. The subject was Meat as Food, which was discussed in a whole-day session, and several outstanding papers were presented.

Dr. John Hammond, F.R.S., in his paper on "Factors influencing the composition and properties of meat", after showing how age, breed and plane of nutrition influence the composition of the carcase, discussed the important effect of subcutaneous and intramuscular (marbling) fat on the cooking properties and texture of meat.

He considered factors controlling the colour and consistency of fat and the colour and texture of muscle and the means of improving the eating qualities of coarser meats.

In his paper on "The chemical composition and physical properties of mammalian and avian meat", Dr. E. C. Bate-Smith differentiated meat into muscle and adipose connective tissue and gave details about the content of myosin, the main muscle protein, and discussed variations in the principal non-protein nitrogenous constituents.

The fat, protein and water content of meat was the subject of a short paper by Dr. E. H. Callow. He said that the proportions of fat, water and fat-free dry residue in meat were closely and simply interrelated. He gave a formula which represented with astonishing accuracy the corelations obtained by him on widely divergent beef carcases: Water $= 78{\cdot}4 \times 0{\cdot}808$ Fat and Residue $= 21{\cdot}6 \times 0{\cdot}192$ Fat.

Mr. A. L. Bacharach then presented a note on the vitamin and mineral content of meat and offals. He gave a brief outline of the available information on the mineral content of meat, its importance as a source of phosphorus, and the unsettled problem of the extent to which muscle iron is available for the formation of hæmoglobin in the consuming animal. He also presented figures for the fat-soluble and water-soluble vitamins in meat and offals, and, finally, a short account of the effect of cooking on the vitamin content of meat.

The last paper on "The effect on meat of cooking and processing" was read by Mr. L. C. Baker, who discussed shrink, etc., due to cooking. Animated discussions followed all the papers.

Food Prosecutions Defences

Judging from the reports on several recent prosecutions, a defence which is becoming common is that based on "a mistake".

In one case a product with the operatic name of "macaroni eggoroni" was described as "wheat and eggs in handy form", but contained neither wheat nor eggs. What was meant by the suppliers was "noodles macaroni", but a large stock of containers marked "eggoroni" (which apparently were used for a product containing eggs) was on hand and were used by mistake. A small label marked "noodles macaroni" was stuck on.

In another case the defendants to a prosecution in connection with egg substitute said that rice custard powder had been put into the packets of the substitute by mistake. One of the defendants complained that, with the Ministry of Labour calling up girls, firms were left with staffs that were "cheeky" and would not ask for instructions. In this particular case the Bench dismissed the charge of using a label calculated to mislead.

In a third case arising out of the sale of diluted acetic acid as white vinegar in which the defendant was charged with using a label calculated to mislead the defence was again that "a mistake" had occurred. Here the Bench convicted on the grounds of an offence, with the proviso that there was no question of an attempt to defraud the public.

It is undoubtedly true that with the type of labour available mistakes may occur, but it is just as well that this defence is not allowed to succeed. It would be much too easy. With suitable precautions the packing of articles of food can be made almost foolproof.

Man-Power, Hours and Wages

Many food manufacturers have been set a pretty problem in connection with the calling-up of workers. The Ministry of Labour and National Service states that the working hours of men engaged in food manufacture and other industries should be 52 per week. The staffs of many firms work only 48 hours a week, and the Ministry claims that in these cases one man in thirteen can be released for the Forces, his place on the staff being made good by extending the working hours of the remaining twelve men from 48 to 52 weekly.

This procedure raises important problems both for employers and employees. Many current agreements on the wages and conditions of labour provide for a normal working week of 48 hours, work in excess of those hours being paid for at various rates ranging up to double time. Now that the Ministry of Labour has virtually prescribed a normal working week of 52 hours for all except clerical workers, the question has arisen whether the rate of payment for the extra four hours should be at the normal rate per hour for a 48-hour week or at overtime rates. The question whether employers should seek revision of the current agreements is involved.

One food manufacturer expressed to us the view that the line taken by the Ministry made overtime rates illogical for a 52-hour week or less. On the other hand, an employer member of a Trade Board said he felt that no such Board would allow itself to be influenced by the Ministry of Labour ruling. If an employer wished members of his staff to work 52 hours a week instead of 48 there was no reason why he should not pay them adequately for the extra four hours. Another member of a Trade Board said the problem could not be dismissed so easily. The point at issue was not whether the employer *wished* his men to work an extra four hours, but that the Minister virtually *insisted* that they should do so.

Closing of Creameries

Statements that have appeared in the daily press to the effect that about 25 per cent. of the creameries in England and Wales are to be closed down on instructions of the Ministry of Food are misleading.

The number of plants not working this season is 126, which represents rather less than one-quarter of the milk factories licensed by the Milk Marketing Board before the war. But 30 of these plants were engaged in salvage operations rather than in direct milk manufacture. The number of creameries not operating this season is therefore really only 96.

As the country's creameries are scattered very unevenly, it is not surprising that the effect of the closures falls much more heavily on some regions than on others. Every one of the Milk Board regions is affected, but the numbers of creameries closed by the Ministry vary from 56 in the North-West (Lancashire, Cheshire, Staffordshire, Derbyshire and the West Riding) to 1 in the South-East. In the Mid-Western Region (Wiltshire, Somerset and Dorset), the second largest milk manufacturing area in the country, 7 creameries have been closed. Figures for other regions include 18 in the West Midlands, 12 in the East Midlands and 9 in North Wales.

Most of the creameries affected are comparatively small. Over 80 per cent. of them are cheese factories; the others butter factories and roller-process milk-powder factories.

The Future of the Milk Industry

Professor H. D. Kay, of the National Institute for Research in Dairying at Reading, gave a stimulating lecture to the Royal Society of Arts on May 20. In view of some praise and blame which the lecturer accorded to the present and recent Governments, it is of interest that the Minister of Agriculture and Fisheries was in the chair. Here are a few of Professor Kay's points: The future of the milk industry is starting to-day; the war is catalysing valuable changes in the industry which might otherwise have taken years to accomplish. We are in the fortunate position that we can *now* give to the industry a fairly close estimate of the future national needs. We know sufficiently well that the average quantity of milk needed for adequate nutrition—*i.e.*, needed to raise the nutritional level of our people to that at which optimal growth and development in general health is reached—is not less than 0·8 pint per head per day and probably not less than one pint. At present the average consumption is just over 0·4 pint per head per day. This figure is slightly greater than in pre-war days, but is slightly less than that attained in the very poorest of the American cities.

Much of our milk is unsatisfactory from the quality point of view (continued Professor Kay). Quick and reliable methods of testing quality are now available, and a simple formula has recently been published on which it would be possible to base a quality payment scheme embracing both hygienic and nutritive value. Such a scheme is likely to materialise in the near future. Milk will be regarded as the keystone of the arch of national nutrition and therefore as a key farming activity; and much greater quantities of it will be needed. Technically, administratively, and educationally, dairy farming and milk processing and distribution will have to be regarded as one unit. These industries already have a combined turnover of some £200 millions a year.

The Fortification of Vegetables

By way of comment on recent correspondence in *The Times*, the *Gardeners' Chronicle* of May 9 had an editorial beginning: "The controversy about the wisdom or foolishness of adding calcium carbonate to bread is of special interest to gardeners. They know the value of lime. Without it neither plant nor soil can be healthy. . . . Like ourselves, the soil can have too much of a good thing, and so wise gardeners act on the principle of little [lime] and often. This being so, they are bound to question the wisdom of trying to make up for the negligence of those responsible for the people's nutrition by plastering bread with carbonate of lime. As an emergency way of remedying the deficiency of lime in our food, that crude and clumsy method can be justified; but as a permanent remedy it

ought to be laughed out of court. Lime deficiency in human diet is unnecessary. It can be prevented by proper food." There follows praise of the cabbage tribe, but cabbages are, it is alleged, being used to feed sheep, although they could be put to more profitable use. "To sum up: People in general in our country do not get enough calcium, and this in a country with vast masses of limestone. Not only people, but plants and animals fail to get enough of this indispensable food. Grass, the chief food of dairy cattle, is less rich in calcium than it should be, because liming grassland (and arable land also) has been neglected. . . . Feed the land, and especially grass-land, with lime. Make *Brassicas* a regular article of diet. Dry all surplus *Brassicas* and market the product. Lay down as much lucerne as possible. Ensure the largest possible supplies of peas, beans and other legumes—these are some of the scientific ways of remedying calcium deficiency."

Since lucerne is usually regarded as a means to an end and not as human food itself, we may add that there is some reason to believe that lucerne was the "grass" which Nebuchadnezzar ate in his time of tribulation.

Vitamin C in Large Institutions

In a well-documented article with the title, "The administration of vitamin C in a large institution and its effect on general health and resistance to infection", A. J. Glazebrook and Scott Thomson, after quoting a large number of authorities on the effects of vitamin C in illness, proceed to describe a series of investigations made in an institution (*Journal of Hygiene*, January, 1942).

The authors point out that in any institution, where large numbers of people are supplied with food from central kitchens, the diet usually contains only small amounts of vitamin C, as destruction of this vitamin takes place during overcooking and the reheating of the food while it is awaiting distribution. This also applies to works canteens, and was commented upon by Professor Drummond in a recent lecture. Incidentally, his solution of this difficulty was the provision of raw vegetables and salads.

The general conclusions to be drawn from the authorities quoted and the investigation carried out were that the evidence that vitamin C exerts a beneficial effect in cases of actual illness is not clear. An acceleration of healing, or a general improvement, in cases of tuberculosis treated with vitamin C has been claimed by several workers, but others state quite definitely that it is of no value.

Summarising their own investigations, the authors state that:

1. Some 50 mg. of ascorbic acid per head per day were required to be added to the diet to produce an optimum excretion level.

2. Large doses of ascorbic acid were given to a group of adolescents in the institution over a period of several months. A record was kept of the incidences of infectious diseases in this treated group and in the remainder (controls). The following conclusions were reached:

(*a*) The incidences of common cold and tonsillitis were the same in the two groups.
(*b*) The average duration of illness due to the common cold was the same in the two groups.
(*c*) The duration of illness of tonsillitis was longer in the control group than in the test group.
(*d*) Cases of rheumatic fever and pneumonia occurred in the control group, but no case of either disease occurred in the test group.

Agar-Agar Substitute

Canners and others in the food industry will be interested in an article in the Bulletin of the Imperial Institute, describing some experiments made in New Zealand on the production of an agar-agar substitute.

Three out of some eight species of the *Gelidiaceæ*, the family to which the best agar-yielding seaweed belongs, seem to warrant serious consideration for commercial exploitation.

It was found that a strong jelling agar could be made from a fairly common species, and a product was obtained which resulted as good as Kobe No. 1 Japanese agar in tests carried out for a food canning works, in bacteriological cultures in the Wellington Public Hospital, and in standard mycological research. Experiments in large-scale production are proceeding.

The weed collected so far has been well selected and free from other species, and half a ton of *pterocladia* is to be processed by the Dominion Laboratory by standard methods, including freezing.

Preliminary difficulties with technique and apparatus are being rapidly overcome, and samples should be soon available for despatch to Britain.

It is predicted that several tons of agar could be produced yearly without unduly depleting supplies of raw material.

British Material for Export

Overseas readers are advised that the fact that goods made of raw materials in short supply owing to war conditions are advertised in FOOD MANUFACTURE should not be taken as an indication that they are necessarily available for export.

Meat Carcase Quality and Ration Yield

FRANK GERRARD.
Smithfield Institute for the Meat and Allied Trades.

IT IS extremely difficult to forecast post-war development in the meat industry, but the present trend of increased yield of meat in terms of actual weight sold in relation to carcases may well continue. Admittedly the question of service and competition plays a much smaller part than formerly, but from the aspect of economic distribution a great deal has been achieved. The butcher *must* utilise practically every portion to obtain the necessary number of rations for his customers.

The return to normal conditions will result in an increase in consumption, but whether or not this will reach the pre-war standards will be influenced by purchasing power and the perpetuation or otherwise of habits acquired during wartime. The figure given by J. B. Orr for expenditure on total meat per head given as a national average (1934) was 29·1d. per week, such prices being based on pre-war figures.

With the present attitude of considering quantity rather than quality, many have appreciated the value of the so-called "coarser" cuts and have learned effectively to deal with those portions, so that subsequent demand may tend to smooth out the great variation in price between the prime cuts and the other joints.

The Live Animal

As a rule there is a local preference for the breed or type of animal predominating in a particular area, and, though the Shorthorn is widely distributed, many breeds are associated with fairly definite localities. In addition to this there are preferences in some parts regarding sex, finish and weight, some buyers considering that heifers mature more quickly and provide better flesh with smoother finish than do steers, while others contend that steers have an advantage, as they are reputed to carry a greater ratio of the more valuable joints. Again, in areas devoted to the dairy industry heifers would be more readily available than steers. Generally speaking, it is probable that these preferences are based rather on custom than scientific grounds, and in the long run it would appear that quality, finish and weight are the more important factors. Consumers show marked variations in the quantity of fat they require with their meat, and this in turn is reflected in the degree of finish in the live animal.

With the extension of mechanical, rather than physical work, the amount of fat required is obviously reduced. The town worker wants leaner meat than his agricultural brother, and the worker in the heavy trades, iron workers, stevedores, etc., must have more calories than, say, textile workers engaged in a warm, humid atmosphere. Even the fat content of what would be considered lean meat is probably much higher than the average person realises. In London and the Home Counties a side of beef of about 300 lbs., with a smooth, light covering of fat, seems to be about the ideal, and such a side might be obtained from a good beast of about 9½ cwt.

Inspection of the Live Animal

Though the inspection of the live animal from the aspect of probable disease is the province of the veterinary world, a few general observations may be of value.

The type and general appearance of the animal is of importance, and one would naturally anticipate that the possibility of disease in an old cow would be much greater than in a prime young steer, and, generally speaking, the older the beast the more likely that it has contracted disease. The normal temperature of the ox is 101·5 F. in a healthy beast; ears, hooves and horns (if present) should be cool to the touch. The coat should be smooth and lie close to the skin, the skin mellow to the touch and freely moving on the underlying muscles. The breathing should be smooth and regular, and if a cough is produced by pinching the larynx, it is indicative of trouble. There should not be any offensive discharges, and abnormal swellings, particularly around the lower jaw, should be looked for. The urine should be straw-coloured, not cloudy, and discharged in a strong, continuous stream, while an abnormal smell from the dung may point to the administration of physic. In the United States it has been found that about 25 per cent. of the animals marked as suspect are condemned at the time of slaughter.

Quality Aspects

From the aspect of quality, the animal should be viewed from the side, and in beef types should present a rectangular form; a straight upper and lower line, with the head short and broad between the eyes. From the back, the rump should appear long and broad, the ribs well sprung and the thighs thickly fleshed. The legs should be straight and short, meat extending well down the hocks, and the bone fine. A coarse tail usually indicates a big-boned animal.

The more common "handling" points can be briefly summarised as follows: The flank will give a general idea of the quantity of fat laid down, as a double fold can be grasped; in very poor animals little more than a double layer of skin can be felt. The degree of fat on the barrel can be judged by placing the thumb and finger on either side of the last rib. If the finger tips are placed on the backbone, above the hip, the thumb can be brought down on to the end of the hip bone. The cod fat, or in the heifer the udder fat, can be examined by holding the tail and passing the right hand between the legs. The two fat pockets on either side of the tail should also be handled for additional indication of finish, and finally there should be no dropping away behind the shoulders.

Long and continued experience is necessary to become an expert in judging the live beast, though in many cases there are individuals who possess an instinct for *knowing* the exact type of carcase obtain-

able from a given animal. With this fortunate individual, first impressions of weight, quality and dressing percentage appear to be more valuable than a carefully considered opinion. An average good judge should be capable of placing an animal within a 5 per cent. error.

Live Weight to Carcase Weight

The dressing percentage is a comparison of the carcase yield in relation to live weight, or expressed in another fashion the pounds of dressed carcase obtained from every 100 lbs. of live animal. The origin of the butchers' stone of 8 lbs., as compared with the 14 lbs. stone, is based on the relation between the carcase weight and live weight. This loss of 6 lbs. per 14 lbs. would give a dressing percentage of over 57 per cent., which is a reasonably high figure for the average run of commercial cattle. It is probable that the old preference for heavily-fatted animals may have influenced this standard. The dressing percentage will depend upon a number of factors, the more important being the stage of maturity, the degree of finish, the breed, and the intestinal content. Yields may range from about 45 per cent. up to 70 per cent., though these figures are extreme and will seldom be met with. The world's record dressing percentage is held by an Aberdeen-Angus at 76·78 per cent. This does not mean that such a beast would prove satisfactory from a butcher's standard, as such a figure could only be obtained at the expense of excessive fat; in fact, figures above 60 per cent. are usually provided by animals which carry too much fat for modern consumer demand. As the dressing percentage increases the ratio of bone decreases; thus a beast dressing out at below 50 per cent. may have over 20 per cent. of bone in the carcase, whereas a really fat prime beast can show half this figure. The effect on the meat yield is obvious, and this explains the rapid increase in the value of a beast as the dressing percentage rises. The dressing percentage is found thus: $\frac{\text{Cold carcase weight lb.}}{\text{Live weight lb.}} \times \frac{100}{1}$ so that a beast weighing 1,000 lbs. live weight, giving a carcase of 560 lbs. $= \frac{560}{1000} \times \frac{100}{1} = 56$ per cent.

If we accept the old practice of "sinking the offal"—that is, assuming that the value of the offal offsets droving, transport, slaughter cost, etc.—we can calculate the cost of the carcase in relation to the live animal cost by the following method:

$\left(\frac{S}{D} \times \frac{75}{7}\right)$, which gives the carcase cost in pence per lb., sinking the offal, S being shillings per cwt. and D the dressing percentage. Thus, assuming that a beast costs 56s. per cwt. and that the dressing percentage is 60 per cent., the carcase cost per lb. would be $\left(\frac{56}{60} \times \frac{75}{7}\right)$ = 10d. per lb.

Carcase Quality

Bone.—Before defining carcase quality, the main constituents of the carcase may be discussed. When, as in the case of mutton, the bone is sold with the various joints, the question of bone content is not of such importance to the buyer as with beef, where the majority of the cuts are sold minus the bone. So that the size of bone in cattle has far more financial significance than the quantity of bone in sheep. Bone consists of about $\frac{1}{3}$ animal or organic matter and $\frac{2}{3}$ inorganic matter, and can be considered as connective tissue in which earthy salts have been deposited to increase their strength. This process of ossification provides valuable evidence of probable age in the carcase, the most valuable points to examine being the surface of the pubic bone, and the spinal processes of the dorsal vertebræ. The persistence of cartilage at these points indicates youthfulness.

Ligaments and Tendons.—The yellow *ligamentum nuchæ* in the neck and shoulders is typical of the former, while the white "tendon of Achilles" is characteristic of the latter. These yellow and white tissues vary considerably in chemical composition, the tendon being rich in collagen, while the ligament is poor in that substance and contains a relatively high proportion of elastin. As collagen can be converted into gelatin by boiling, this difference is of importance when preparing jelly stock.

Fat.—Fat is deposited in and on the animal as a reserve store for future needs, and in the ox it appears to be laid down in the following order: around the intestines, the kidneys, and then on the rump, extending along the back, round the barrel and under the belly. The neck and shanks are the last portions to become covered with fat, and in a stocky, short-shanked animal it is more easy to obtain a good finish on these parts than in a leggy type. To a certain extent the body fat will resemble the fat taken up in the feed. When an animal lays down fat the fat cells increase not only in number but also in size. According to Moulton, the diameter of the cells in a poor steer is only about $\frac{1}{3}$ of those found in a very fat animal. It is probable that the wide variation in colour may be influenced by the size of these cells and the relative amount of connective tissue. Marbling—*i.e.*, the infiltration of fat between the muscle bundles—is always taken as an indication of quality; it shows that the animal is well finished, and the fat introduces flavour into the meat, and on cooking exerts a basting effect within the meat. There is always a certain amount of fat present even in the leanest meat, and even "Bobby" veal may contain 10 per cent. of fat. For the modern demand a carcase containing over 30 per cent. of fat would be considered as being too well finished.

Muscle.—This consists of a number of fibres held together by connective tissue. Each fibre is a small elongated sac, with a fine exterior membrane, enclosing the meat protein myosin and myogin, and with them certain salts and acids. The connective tissue contains a large percentage of collagen, a tough substance, which, as already mentioned, can be converted to gelatin. The proportion of connective tissue in the muscle is dependent on the activity of the muscle in the live animal. Thus the leg muscle, which is subjected to great stress during the movement of the animal, contains much connective tissue, and is therefore used for boiling or stewing, while the fillet muscle (*psoas*) has little work to do, contains very little connective tissue, and is used for grilling or frying. This differentiation influences the cutting of the carcase, and the value of the different cuts.

The colour of muscle tissue is due to the red colouring matter in the blood, hæmoglobin. When a joint is freshly cut there is a lightening of colour caused by the combination of the hæmoglobin with atmospheric oxygen. As the surface dries it becomes darker, the rate depending upon temperature and humidity. The

hæmoglobin content is high in the bull, and this accounts for the darker colour, though it is probable that the normal low fat content plays a part. There appears to be little information as to the cause of "black beef".

The Flavour of Meat

Flavour is difficult to define, but it depends upon the type and amount of nitrogenous extractives. It is generally agreed that flavour develops with age. Hammond found that there is a correlation between high flavour and dark colour in the muscle. The type of feed plays a part, and the full flavour of Hill sheep as compared with Down types can be attributed to the types of feed consumed. During storage at temperatures above the freezing point of meat, in addition to an increase in tenderness, other chemical changes go on which influence the flavour, and should the storage period be too protracted the proteins may be broken down into simpler bodies. Under good storage conditions the question of flavour changes due to bacterial action or mould growth should not arise, except in the case of game, ham and dried sausage.

To the buyer of cattle the beast with the best conformation is one which will yield the highest proportion of valuable joints with a small percentage of bone. The external indications of probable quality in the carcase are a smooth external covering of creamy white fat, well fleshed round loins and ribs, and the presence of cartilage on the pubic bone and spinal processes. A large number of factors influence this quality in beef, the more important being breed, feed, age, sex, activity, pre-slaughter and slaughter conditions and the methods of storage. Many of these are interdependent, but all influence the quality of the final product.

Carcase Cutting and Ration Yield

As the present ration scheme is based on value, not weight, and the prices in the case of first quality of English beef range from 8d. per lb. (leg bone in) to 2s. 2d. per lb. (fillet steak), it is obvious that the ration yield per carcase will be materially influenced by the skill of the cutter. For example, the round of beef at 1s. 4d. per lb. adjoins the leg, so that an error of 2 per cent. on a 300-lb. side would result in a decrease of 8d. per lb. on 6 lbs. of meat, a loss of almost three and a half 1s. 2d. rations. This example is, of course, extreme, but it exists in a modified form throughout the carcase. Therefore from the national aspect as well as that of the butcher, the importance of this cutting and preparation for sale cannot be overstressed. The best method of checking this ration yield is by a percentage analysis of representative carcases based on the cutting used in the specific locality. Assuming that we find, say, in the case of imported hindquarters it is possible to obtain 135 rations from a quarter of 165 lbs., each 100 lbs. of such meat can produce as a maximum $\left(\frac{135}{165} \times \frac{100}{1}\right) = 81{\cdot}8$ rations.

Thus, if we multiply the gross weight of this meat by $\frac{81{\cdot}8}{100}$ we can find the potential rations and by comparison with the actual number assess efficiency in the general scheme of distribution. If this principle is applied to all the wholesale cuts, it should not be too difficult to analyse a weekly quota, provided that a cutting standard is established. In a good first quality English side of beef weighing 300 lbs. the following approximate percentages for the various cuts should be obtained, when the side is cut in the normal fashion, as generally employed in London and the Home Counties.

	per cent.		*per cent.*
Round (with skirt and fat) ...	16·0	Forerib	6·7
Thick flank ...	5·4	Middlerib ...	10·3
Pubic bone ...	0·7	Steakmeat ...	10·0
Rump (and suet)	9·0	Flank and brisket	14·0
Loin (with suet and kidney) ...	12·0	Clod and sticking	8·5
		Loss	0·2
		Leg and shin ...	7·2

Thus a 300-lb. first quality English side of beef should yield approximately the following value of rationed meat:

Joint.	*Weight (Lbs.)*	*Control Price per Lb.*	
		s. d.	*£ s. d.*
Round of beef (whole) ...	48	1 4	3 4 0
Thick flank	16½	1 3	1 0 4
Rump (whole)	27	1 6	2 0 6
Sirloin (less suet and kidney)	28½	1 5	2 0 4½
Forerib	20	1 4	1 6 8
Middle rib (topribs ...	14¾	1 2	0 17 2½
Middle rib (backribs ...	16¼	1 1	0 17 7
Steakmeat (boneless) ...	26½	1 4	1 15 0
Flank and brisket	42	0 10	1 15 0
Clod and sticking	25½	0 8	0 17 0
Leg and shin	21½	0 8	0 14 4
	286 lbs.		£16 8 0

Not rationed.—

	lb.	*s. d.*	*s. d.*
Ox kidney ...	1	1 6	1 6
Suet	6½	1 0	6 6
Bones	5½	0 1	0 5½
Loss	1	—	—
	300		£16 16 5½

(In the example above the pubic bone was removed, and the other joints include bone, with the exception of the steakmeat, for which there is no control price, bone-in.)

Thus the maximum number of rations obtainable on the bone in basis would be approximately 281. When sold without the bone, appropriate increase is made in the control price; thus, after allowing for the loss in preparation, evaporation, etc., the number of rations obtainable would agree fairly closely with the figure given above.

It will be seen that the rump, sirloin and forerib is roughly 25 per cent. of the side, but it represents almost 33 per cent. of the total value of the rationed meat, whilst at the other end of the scale the clod, sticking, flank brisket and shanks, about 30 per cent., only form 20 per cent. of the value. These two examples bring home very forcibly the association between the conformation and value of the live beast.

Canned Meats

The Relation between the External Appearance of the Packs and the Soundness of the Product

A paper read at the Thirty-fifth Annual Convention of the National Canners' Association held at Chicago in January of this year.

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THE PRESENT defence programme requires the production of large quantities of canned meats. These items are inspected during manufacture, before shipment, and upon arrival at their destination. The method of examination for the vast majority of the cans must, of course, be adaptable to unopened cans.

For unopened cans, an examination of the external appearance generally constitutes a basis for judging the probable soundness of the product. This procedure is based on experience and upon the assumption that cans with the same external appearance will contain products which are in a similar condition. This point is usually confirmed by examining the contents of sample cans. An understanding of the factors which influence the external appearance of cans is helpful in determining the soundness of the product.

Experience has shown that cans with the same or similar external appearance do not always contain products which are in the same condition. Thus it is not always possible to be certain of the condition of the contents of a can except by examination after the can is opened. The purpose of this discussion is to correlate the variations in appearance to give a better understanding of the probable soundness of the product.

Scope of Examination

In the examination of the external appearance of cans, careful observations should be made as to the condition of the ends, body or sides, any abnormalities, denting from rough handling, or obvious defects. Before examination, the cans should be held for a sufficient length of time at adequate temperatures to permit any changes in external appearance which might result from spoilage. The following list includes the more important information which may be secured from careful examination of a container or from suitable records :

1. General information :
   - (1) Type of can.
   - (2) Code marks.
   - (3) Date packed.
   - (4) Date of shipment.
2. Condition of the ends with respect to internal vacuum or pressure :
   - (1) Flat.
   - (2) Flipper.
   - (3) Springer.
   - (4) Swell.
3. Condition of body or sides with respect to internal vacuum or pressure :

   Round can :
   - (1) Normal.
   - (2) Panelled.

   Oblong can :
   - (1) Well drawn in.
   - (2) Springy.
   - (3) Swelled.
4. Abnormal conditions :
   - (1) Degree of dents and their location.
   - (2) Buckled ends.
   - (3) Rusting.
   - (4) Distortion of can.
5. Obvious defects :
   - (1) Nail holes.
   - (2) Poor soldering.
   - (3) Obvious leakage at seams.
   - (4) Broken score.

Round cans with flat or concave ends and oblong cans with flat ends and well-drawn-in sides are considered normal. In the vast majority of instances, cans with normal appearance contain sound and wholesome products. With canned meats, instances where the contents of normal cans have spoiled are exceedingly rare and, in genral, it is safe to assume that the product in a normal can is sound.

Many round cans have flat or concave ends and bodies which are panelled. Panels in the bodies of cans occur more frequently in the larger-sized cans. Panelling is the result of high vacuum in the cans, which causes the can body to lose its cylindrical shape due to contraction. This condition is normal for large cans which have received a good exhaust either by heating or by means of mechanical vacuum. Panelled cans should be classified as normal.

Significance of Dents

Some cans are normal in every respect except that they are dented. This condition of cans is noted most frequently after shipment. It is the result of rough handling. Dents vary in degree from slight nicks, which are hardly noticeable, to deep gouges. Unless the denting is severe, spoilage is not likely to occur in the case of well-made cans, and can result only from a break in the tinplate or badly damaged seams. In more

severely dented cans, spoilage is less likely to result from dents in the centre of the body of the can, and more likely to appear as the result of dents at or near the seams of the can. If spoilage does occur from denting, the cans become swells and come under this classification. Swells due to leakage from denting usually develop rapidly in warm temperature storage—that is, 75° to 98° F.

It is advisable to segregate badly dented cans from those known to be acceptable and hold them for two weeks in warm storage to determine whether or not they become swells.

When examining dented cans it is desirable to know the date of shipment or the date of the last rough handling. If considerable time has elapsed between this date and examination, cans which leak due to dents will show some evidences of spoilage. The normal but dented cans from which questionable cans are segregated may be considered to contain sound product.

Buckling of Ends

Occasionally cans are normal except that the ends are buckled. Buckles consist of a permanent distortion of the ends near the seams. They result from straining of the can ends, which is caused by the development of excessive pressures within the cans during processing. When buckles are not severe, the contents of cans which are normal in all other respects may be considered sound.

Leakage through seams strained by excessive internal pressure which caused buckles may produce swells. Questionable buckled cans may be handled in the same manner as dented cans. In this case, the date of packing is of value in determining whether or not sufficient time has elapsed for swelling to occur in cans which leaked.

Cans with flat or concave buckled ends should not be considered as swells. This error in classification has often occurred. Swells are cans the ends of which are bulged or convex. Cans with flat or concave ends are not swells, although the ends may be buckled.

Rusted Cans

Cans may be normal in appearance except that the tinplate is rusted. To prevent this condition, most meat cans for defence purposes are lithographed, lacquered, or enamelled on the outside. Unless the rusting is sufficiently severe to perforate the tinplate, the product in cans normal in all respects except rusting is practically always sound. In the case of rusted cans it is desirable to use the canned product promptly, or, if this is not possible, to remove the rust and cover the area of tinplate so attacked by rust with lacquer or oil so as to minimise further rusting during storage. It would not be advisable to accept rusted cans for storage over long periods of time, especially should the conditions of storage include high humidity, temperature changes which are conducive to the condensation of moisture on the cans or proximity to salt water.

Cans of certain non-acid vegetables, tomato juice, and products which contain sugars and starch may have normal exterior appearance, but the contents may be sour and spoiled. Such cans are known as "flat sours". Flat sour spoilage generally results from under-processing of the cans and the growth of heat-resistant bacteria producing acid. No gas is produced, however. As indicated above, flat sour spoilage occurs so very rarely in canned meats that it has no practical significance.

Leaks in Cans

A few cans may appear to be normal, but a careful examination will disclose an obvious leak. This condition usually results from a nail hole, broken score, vent holes which were not soldered, or from gross imperfections in the seams. Cans with gross defects are usually easy to detect due to the magnitude of the defects themselves, noticeable leakage of the contents, or loss in weight. The contents of these cans are usually spoiled.

Cans containing some vacuum-packed products, such as bacon or dried beef, may appear normal although actually leakage has occurred. Detection of such cans from their external appearance is difficult. Fortunately, these products are preserved by curing and drying, and spoilage is not likely to occur. However, loss of quality from rancidity and oxidation or possibly mould growth may occur.

Certain cans are grossly distorted due to excessive denting, severe strains due to retorting, excessive vacuum combined with underfilling, and similar causes. While these cans may belong in the classification outlined above for normal cans, experience has shown that it is difficult to predict the condition of the contents. There is always a strong possibility that such cans may have leaked. Because of this possibility of spoilage, the contents should be considered as spoiled until examination of the product shows it to be sound.

"Springers"

A springer is a can one end of which is slightly bulged. When this end is forced in, the opposite one is pushed out. The sides of oblong springer cans act in a similar manner. This results from the pressure in the interior of the can being slightly greater than the external or atmospheric pressure. A flipper is a can one end of which becomes bulged on percussion but which, when pushed in, remains flat. As the causes of this condition of cans are similar, and the probable soundness of the product depends largely upon the causes, the condition, springers, and flippers will be considered together. Experience has shown that when some factors cause springers, the product is spoiled, and when other factors are involved, the product is sound. Therefore, the contents of springer cans should not be considered sound unless they are proven so by examination. Following is a list of the more important factors which may cause cans to become springers or flippers while the product remains sound.

1. Over-filling of the can.
2. Low closing temperature of product when can is heat exhausted.
3. Insufficient vacuum when vacuum is obtained by mechanical means.
4. Changes in altitude and temperature of storage.
5. Chemical reaction between product and can.
6. Chemical reaction between the ingredients in the product.

The factors which cause springers and flippers due to undesirable changes in the product are :

(*Continued on page* 195)

Food Packing Research

D. W. GROVER, B.Sc., A.I.C.

AS A WARTIME measure the British Standards Institution is finding ways for reducing the consumption of packaging materials to the minimum requirements for satisfactory protection of the goods. The Printing and Allied Trades Research Association, in collaboration with other interests, is examining the prospects for starting a programme of packing research. All this is of obvious importance to food manufacturers, who have always given much attention to the protection and presentation of their products. Their interests are actively represented at these discussions by the trade associations and by individual members of the trade.

Packing Knowledge Available

Excluding metal containers, what is the present state of our knowledge of packing materials and packages? There is undoubtedly a great deal of special knowledge in the possession of individual firms and organisations which has not been published. Apart from this, most of our information concerns the properties of packing materials as distinct from finished packages. Organisations equipped for the mechanical testing of packages, of which the Forest Products Research Laboratories is an example in this country, do not appear to have made public much of their work on this subject. The laboratories mentioned have prepared specifications for egg containers and butter boxes.

Wooden containers, chiefly packing cases and kegs, are traditional for many goods and can compete successfully provided attention is paid to details of construction. Barrels and kegs make satisfactory containers for lines packed in bottles and jars.[1]

The Modern Package

The modern package has not only to provide protection and decoration for its contents but must also fit into the factory scheme for mass production as regards such operations as forming, filling, sealing and labelling. To do this successfully it should be based on one of four basic shapes: cylinder, oblong, rectangle or cube.[2] Character may be introduced by minor modifications, but shapes which depart far from these four lead to production trouble.

During the past twenty years many new wrapping materials have made their appearance, each providing some degree of protection from penetration by moisture, grease and so on, or, equally important during that period, opportunity for novel and attractive display. Specially treated papers of the waxed, glassine and parchment and other types compete with regenerated cellulose film in various grades and rubber-derived film. Other materials have been mentioned in the patent literature and may have found their way to production. An instance is a carton now used for packing emergency rations in the United States which is impregnated with a thermoplastic resin and is claimed to be resistant to moisture and most gases.[3] Many of these special films are adapted for heat-sealing, a considerable advantage in production.

The food manufacturer requires to know which of these materials are suitable for his product. A primary requirement is for mechanical strength. Tests for this, which are fairly well standardised, are discussed in a useful review by Grant.[4] Other requirements may be for protection against moisture, grease, etc., and, without doubt, satisfactory hygienic quality. Tests for these are not so well developed as are those for mechanical strength.

Moisture Permeability

It is often an important function of wrapping material to prevent loss or absorption of moisture. Airtightness is no guide to efficiency in this respect. For instance, regenerated cellulose is almost impervious to air, but unless specially treated offers little more resistance to the passage of moisture than open copper mesh. The National Bureau of Standards, U.S., have examined a large range of sheet materials by several methods[5] and found extreme variation in moisture permeability. One material alone, waxed paper, covered almost the whole range—from totally impervious to no protection. The explanation for the easy penetration by moisture of materials which offer great resistance to gases, such as air, is probably based on the fact that the moisture content of such materials varies with the relative humidity. As a result of this, a side in contact with moist air will contain more moisture than a side in contact with drier air. This condition is unstable and leads to the passage of water molecules through the film in association with the molecules of the wrapping material. That is, it does not penetrate as a gas, the condition in which it exists in the atmosphere.

The Testing of Materials

Methods proposed for determining moisture permeability differ considerably amongst themselves, but all depend upon exposing one surface of the film to damp air and the other surface to drier air. Passage of moisture through the film depends on eight factors: Area of film; leakage; thickness of film; difference in water v.p.; temperature; relative humidity; time; and permeability to moisture of the film.

In a standard method most of these factors are kept constant and the passage of moisture depends only on the permeability and thickness of the film. The influence of temperature and humidity makes it desirable that values should be chosen for these variables similar to those in which the wrapping material is likely to be used for the test. For instance, a lower humidity will be required when testing wrapping paper for confectionery than for fruit, meat, etc.

American chemists have made a study of the suitability of wrapping materials for frozen foods.[6] Apart from moisture permeability the tests recommended include staining by foodstuff in contact, grease-proof

quality, brittleness at low temperatures and flavour. Such tests or modifications adapted for other foods are no doubt in constant use, although no standards are agreed upon in this country at present. Wrapping paper may have a tendency to corrode metal with which it comes into contact, an undesirable quality generally associated with a low *p*H. If the latter value is below 5 there is danger of corrosion, whereas if above 5 there should be no trouble from this source.[7]

Impurities in Wrappings

Papers and other wrapping to be used in contact with foods should be as pure in the hygienic sense as the foods themselves. Impurities likely to occur and to which objection could be taken may be classified into three groups :

1. Bacteria, moulds, etc.
2. Chemical ingredients of the wrapping material.
3. Chemical impurities in the wrapping material.

1. The evidence concerning the survival of bacteria and moulds in the manufacture of paper and board is conflicting.[8, 9] On the one hand, it is claimed that the drastic treatment which pulp undergoes makes it impossible for bacteria to survive and that the average count is only 230 harmless organisms per gram. On the other hand, it has been found that board made from virgin pulp is almost free from micro-organisms, while if made from a large proportion of waste paper it is much more heavily contaminated. This is an aspect which appears particularly worthy of consideration at the present moment. It is more certain that at some stages of the manufacture of pulp suitable conditions exist for the propagation of micro-organisms, many of a slime-producing nature.[10] Unless their activities are restricted by careful control, unpleasant odours and tastes result in the finished board, irrespective of the survival or not of the infecting organism. It is, therefore, important that sanitary conditions should be maintained in plants producing paper and board for the food trades.

Sterilisation of Materials

Wrapping material intended for contact with foods may be rendered more nearly sterile by treatment just prior to use. Paraffining, while primarily intended to render paper and board moisture proof, is very effective in reducing contamination. Naturally, the requirements for milk cartons prepared by this means are very stringent, and there is a conflict of opinion as to whether the high temperature employed, together with the immobilising action of the wax, is sufficient to meet these requirements.[11, 12] One authority states that unless higher temperatures and longer times are employed separate bactericidal treatment is desirable.

Parchment paper for wrapping butter, etc., may be freed from moulds by boiling in water or brine or by treatment with antiseptic solutions.[13, 14] Clayton[15] gives recommendation for dry sterilisation of paper, etc., in stacks by heating at 88° C.

2. The chief examples of chemical ingredients to which exception might be taken are hygroscopic materials added to improve the pliability of parchment, waxed papers and regenerated cellulose. As regards parchment paper, the quality normally used in contact with foods—hard neutral sheet—is claimed to be free from such substances.[16] Other grades may contain glycerol, magnesium or calcium chlorides and so on. Similar remarks apply to waxed paper; where extra pliability is required such additions are sometimes considered necessary. One objection to the inclusion of water-soluble matter in food wrappers is that they may form a favourable medium for mould growth. For this reason a maximum of 1·3 per cent. water-soluble extract is stipulated in suggested standards for parchment paper.[17]

Inks and adhesives may perhaps be included under this heading. They should naturally comply with high standards of purity, freedom from objectionable odours, poisonous metal, etc.

3. In connection with chemical impurities it is a safe rule to insist that wrapping material for immediate contact with foods should comply with substantially the same standards of purity as the foods themselves. In special cases it may be proved that traces of heavy metals, etc., in the wrap do not contaminate a food in contact. For instance, it has been found that only part of the iron in vegetable parchment is available for contamination of foods wrapped in the parchment, especially if the food is not acid in nature.[18]

Miscellaneous Wrappings

In several cases the use of wrappings impregnated with antiseptic chemicals has been proposed to delay the deterioration of perishable foods. Iodine and biphenyl for fruits and sodium and calcium propionates for butter are examples of this class.[19, 20, 21] Shirlan (sodium salicylanilide) is a satisfactory mould deterrent in butter boxes,[18] and may be applicable to wrapping paper also. Whether such treatments are desirable from the Food and Drugs aspect is not clear.

Transparent film, which has been substituted in some cases for more opaque wrapping in order to obtain more fashionable presentation, is undesirable for fatty foods owing to the accelerating effect of light on the oxidation of fats giving rise to rancidity. Study of this problem has revealed that both the intensity and wavelength of the transmitted light are important in relation to induced rancidity; light having wavelengths of 4,900 and upwards having no effect. Coloured wraps intended to overcome this defect by eliminating blue and ultra-violet light should be properly tested before their efficiency is assumed. Reliance cannot be placed on the mere presence of a yellow or red colour to stop the penetration of harmful rays. With strongly coloured wrappers the total light transmitted is of greater importance than the actual colour.[22, 23, 24, 25]

Metal Foils

Almost all the metal foil used for wrapping food just before the war was aluminium. Foil has definite advantages, which are not found combined in any other material. It is impervious to moisture and grease, opaque, and, owing to its bright reflecting surface, it provides a useful degree of protection from heat. It is not, as is sometimes stated, impervious to insect infestation. A useful property not met with in any other material is its ability to conform closely to irregular shapes without cracking. Foil in contact with foods of a corrosive nature may be protected by coating with a suitable composition.[26, 27, 28, 29]

Outstanding Problems

By way of summary it may be useful to suggest what are, in the author's opinion, the outstanding food packing problems awaiting research. They are :

1. Testing finished packages mechanically and in relation to their moisture-proof and other properties. From the wartime point of view such research would lead to economy of materials.

2. Defining standard tests for wrapping materials acceptable to manufacturers, users, etc.

3. A survey of the hygienic quality of wartime wrapping, with measures to improve it, if necessary.

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Meat Analysis

At a recent meeting of the Society of Public Analysts and other Analytical Chemists, the following papers were presented and discussed :

The Analysis of Foods containing Meat, Cereal Filler and Soya Bean Meal. E. T. Illing, B.Sc., F.I.C., and E. G. Whittle, B.Sc., F.I.C. Analytical data for samples of soya bean meal and of cereal fillers ("pabs" and bread) were given and discussed in relation to the methods used. Starch was determined by several methods : precipitation by alcohol and precipitation as iodo-compound, which in some instances was decomposed and the starch precipitated by alcohol and weighed. Soya meal gave consistently high results by the first method, and moist mixtures of soya meal and bread gave low results by the last one. Methods were suggested for calculating the contents of soya meal, cereal and filler and meat in sausages and the like from the determined percentages of water, fat, protein, starch (by alcoholic precipitation) and salt-free ash. Some observations were made on the microscopic detection of soya.

The Iodine Value as an Index of the Relative Firmness of Pig Back Depôt Fat. W. Bolton, M.Sc., and R. G. Baskett, M.Sc., A.I.C. Read by K. A. Williams on behalf of the authors. For pig back depôt fat a close correlation was found to exist between the iodine value (Wijs) and the firmness as measured by means of the grease penetrometer of the Institute of Petroleum technologists. The firmness measurements were carried out at 30·5°, 32·0° and 46·5° F., at which temperatures the average depths of penetration were 4·5, 6·4 and 15·3 mm. The correlation coefficients between iodine values and depths of penetration were +0·9564 (23 samples) at 30·5°, +0·8543 (28 samples) at 32·0°, and +0·7136 (28 samples) at 46·5° F. In laboratories where the close temperature control necessary for penetrometer or similar direct tests of firmness are impracticable, the iodine value will give a more accurate measure of the firmness of these fats.

Food from Canada

Canada has undertaken to deliver 268,000 long tons of bacon to this country this year. This is an advance of 350 per cent. on the pre-war figure, and will involve 5,000,000 hogs.

An interesting commentary on the requirements for producing these extra supplies is the fact that approximately 1,000 lbs. of food is required to bring each hog to market weight.

To increase Canada's bacon-producing potentialities by so large a margin in so short a time represents in itself a major feat of agricultural economy.

Another large item under agreement is eggs, Canada having undertaken to deliver 540,000,000 to Britain in 1942. The eggs will be shipped for the most part in dried form, since the transport of foodstuffs is now conditioned entirely by the nature of shipping space available, and in their dried form eggs are more easily accommodated in the North Atlantic ships. The quantity is over thirty times the amount delivered by Canada to Britain annually before the war.

In addition to the eggs and bacon, arrangements have been made for 10,000 long tons of other pork products, while 125,000,000 lbs. of cheese will be shipped—almost double the pre-war exports to this country.

Another item in the account is for 15,000 tons of evaporated milk.

The prices of these commodities are being kept at the lowest possible level consistent with costs of production, and quality is encouraged by a system of Government bonusing, which will involve the British consumer in no extra charge.

Taking the animal products as a whole, Canada is this year shipping 380,000 long tons as compared with 275,000 last year.

Training in the Technology of Meat

The aims of the Smithfield Institute for the Meat and Allied Trades comprise the complete education of a meat technologist. The Institute also, among other things, acts as a link between research and advisory bodies and the meat industry and carries out independent investigations on the technology of meat.

TECHNICAL training for the meat industry was started in London in 1922, when classes at Salters Hill were organised for apprentices in the meat trade. At the outset, eight students only were enrolled, but with the support of members of the trade the numbers rapidly grew, and, as a result, the L.C.C. decided to adapt an old school building in Saffron Hill for housing the classes, and this, later, became the Smithfield Institute for Meat and Allied Trades. With the increased accommodation thus provided it became possible to arrange day classes for apprentices, and groups of boys attended in their employers' time. Later, the work was developed to include a Junior Technical School and a Senior Day School, as well as part-time special courses on Refrigeration, Meat Inspection, Small Goods Manufacture, and a full course in preparation for the Diploma in Meat Technology of the National Federation of Meat Traders.

In 1932, the Institute was given the status by the L.C.C. of a Senior Technical Institute, and an Advisory Sub-Committee was formed, consisting of representatives of the London County Council and representatives of the various bodies interested in the production, preparation, and distribution of meat, thus ensuring representation of both the technological and practical aspects of the industry.

The Institute can claim to be the first of its kind in the world. Pioneers of the work here have also acted as advisers in the development of similar institutions in South America, Australia, South Africa and Holland.

In April, 1941, the building at Saffron Hill was destroyed by fire, and the work of the Institute is now carried on in St. John's Lane.

The organisation now comprises the following sections :

(*a*) A Junior Technical School for boys of 13-16 years who are desirous of entering the meat and allied trades. The work consists of a study of English, Mathematics, History, Geography, Science (Physics, Chemistry and Biology), Business Practice, Book-keeping and Meat Technology. Hitherto the course has extended over two years, but it is hoped in some quarters that it will be extended to three years at the end of the war. Twenty Scholarships and Exhibitions are awarded annually by the L.C.C., whilst the Meat Traders Federation make grants from their Scholarship Fund to assist deserving boys.

(*b*) A Senior Day School. Before a student enters this School he is expected to have taken the General Schools Certificate or its equivalent. Students in the past have been drawn not only from the secondary and public schools of the country, but also from South America, Germany, Denmark and Holland. The course followed extends over two years and includes a study of Animal Physiology, Physics and Chemistry, Veterinary Pathology and Bacteriology, Business Organisation, Economics, Food Chemistry, and the Technology of Refrigeration and Meat Commodity.

(*c*) Part-time Courses. Courses, extending over three sessions, are arranged in preparation for the Diploma in Meat Technology. Special courses are also given in Refrigeration, Poultry and Game, Laboratory Technique, Meat Inspection and Food Hygiene. In the pre-war period, short courses for Indian Army Officers were a regular feature of the work.

The main aims of the Institute are :

(i) To act as a link between the Research and Advisory Bodies and the Meat Industry—*i.e.*, to interpret and give practical shape to the findings of the research workers. This work involves not only problems relating to the production of meat but also its treatment in fresh and frozen condition, problems of transport and storage, and an attempt to influence production so that it may bear a closer relationship with the demand of the consumer.

(ii) To carry out investigations in subjects varying from the de-boning of beef to the efficiency of equip-

A study in concentration.

Embryo Meat Technologists in the Chemical Laboratory.

ment for meat factories. The knowledge obtained is passed on to the trader to increase his efficiency as a servant of the public.

(iii) To give the meat trader scientific data on food values, so that he may be in a position to deal intelligently with the frequent claims made in favour of well-advertised foods.

(iv) To attempt to ensure that full use is made of by-products of meat. In this country, particularly in the pre-war period, many of the animal by-products were wasted; in fact, much may be learned from American and continental practice regarding the utilisation of so-called waste. Under war conditions this matter becomes of national importance, and not only the abattoir operative but the retail operative can obtain much benefit from such extended knowledge.

(v) To foster pride in craftsmanship. The craft of the butcher has passed through many vicissitudes since the formation of the Guild of " The Art or Mistery of Butchers " (now the Worshipful Company of Butchers) in 1180. In many respects it would appear somewhat unfortunate that the apprenticeship scheme, once so strong a feature of the Guilds, should have fallen into disuse. The common bond, inherent in the ancient Guild, between master and man undoubtedly stimulated a high standard of craftsmanship and service to the public.

Investigations Undertaken at the Institute

The following notes give some indication of the investigations that have been and are being carried out at the Institute :

(1) Investigations on cattle and beef for the Ministry of Food carried out by the Food Investigation Board, Cambridge, with the assistance of a member of the staff of the Institute. (As a result of enemy action it became necessary to discontinue this work in London, but it is now being carried on at Cambridge.)

(2) Problems on the reconstitution and utilisation of dried meat.

(3) Use of soya bean flour in meat products.

(4) Defrosting of frozen beef at low atmospheric temperatures.

(5) Work on the " Tenderising of Beef " carried out in conjunction with the Westinghouse (Sterilectric) Company. (War conditions made it necessary to discontinue this work in 1940.)

A new building was under construction at the outbreak of the war to provide for training in practically all the branches of Meat Technology. There will be facilities for scientific training (Physics, General and Food Chemistry, Biology, Physiology, Pathology and Bacteriology) to form a sound foundation for Food Technology, as well as opportunities for investigations and research.

Food Manufacturing Equipment

Its Depreciation and Maintenance

S. HOWARD WITHEY, F.C.I.

AN analysis of the audited accounts of certain food-manufacturing companies covering the past year's operations, shows that in the drafting of balance-sheets the valuations which have been placed on sections of plant and on groups of productive equipment do not always bear any direct relationship to the amount of unrecovered investment in respect of which the owners expect, sooner or later, to be reimbursed.

Admittedly, the general position in this respect is aggravated by the fact that engineers and business executives hold conflicting views as to the proper methods to be adopted. Having regard, however, to the large amount of capital which has been invested in equipment for crushing, grinding and superfine disintegrating, mixing, sifting, weighing and conveying, etc., and in evaporating and condensing plant, exhausters, processing retorts, and other similar units, it is very necessary that adequate provision should be made in costs to cover depreciation due to wear and tear, corrosion, obsolescence or effluxion of time.

Scrapping of Obsolete Plant

Food factories are constantly reaching that stage where the manufacturing equipment is no longer capable of maintaining efficiency, necessitating the installation of more modern units or layouts, and a ruthless scrapping of the old. Moreover, improvements in design and operating refinements, and extensive research and investigation, are rapidly rendering obsolete not only individual machines but entire systems, and in many factories at the present time the continuity of the manufacturing operations depends largely on the facilities and appliances available for carrying out repairs and overhauls, and for effecting adjustments.

Under existing conditions, the assessment of asset values and the determination of depreciation demand a considerable degree of specialised knowledge, and while there are several methods whereby this can be effected, many of the difficulties arise from failure to exercise a physical control over the progress of the various equipment.

Determination of Depreciation

Recent experience has proved that some installations can be adapted to give the very best results. In the latest types of crusher and disintegrator, for instance, efficiency and economy have been developed to the utmost, and an almost unlimited variety of materials can be reduced to any desired degree of fineness. Before deciding the method to be adopted for the computation and recording of depreciation, it is essential, therefore, that the progress of the different units and sections should be properly controlled, having regard to the conditions under which they are being operated.

To be of real practical utility, all equipment used for similar purposes should be grouped together in the

records, a summary being then made, showing the number of units of each class and all variations made. In some cases, the equipment is more varied than is required in relation to productive capacity; in others, the records may show that output is being retarded by the use of inadequate plant, or by an insufficiency of the right types. By rearranging certain installations it is often possible to discard some units and reduce costs, and where equipment is subjected to proper control much more satisfactory results are obtained than is possible when no systematic attempt is made to check the manufacturing assets.

Machinery Record.

Description: .....

. .....

B.H.P. ..... *Lubrication* .....

Location .....

Size ..... *Weight* ..... *Constructor's No.* .....

Attachments ..... *Cost* £ : :

Ordered ..... 19... *Received* ..... 19... *Installed*..... 19...

Estimated Service Life ..... years. *Rate of Depreciation* ..... %.

Cost of Acquisition £ : : Cost of Transport £ : : Installation Cost £ : :

Back of Card.

Value as at ..... 19...	Value as at ..... 19...
Less Depreciation written off ...	*Less* Depreciation written off ...
Diminished Value	Diminished Value ... ...
Additions	Additions ... ...
Value as at ..... 19...	Value as at ..... 19...
Less Depreciation written off ...	*Less* Depreciation written off ...
Diminished Value	Diminished Value ... ...
Additions	Additions ... ...
Value as at ..... 19...	Value as at ..... 19...
Less Depreciation written off ...	*Less* Depreciation written off ...
Diminished Value	Diminished Value ... ...
Additions	Additions ... ...

Records of Equipment

Records of machinery not only facilitate claims in such matters as fire and other insurances, income tax assessments, etc., but enable decreases in capital value to be readily ascertained. Consequently at many food factories very elaborate equipment records are now kept, usually in the form of printed cards which have been suitably ruled, and which can easily be maintained in alphabetical or any other desired sequence. Although several styles of card are in use, the example here shown may be regarded as a typical general pattern capable of modification to satisfy any specific requirement.

At the top of each card, sufficient space can be reserved for particulars such as the location of the machinery, the size, weight and constructor's number, and columns may be provided for showing the original cost of acquisition, the transport charges, installation expenses, and any foundation charges, also for the dates of periodical assessments. These cards should be kept in a drawer, where they can be maintained in position by means of a steel rod or other similar device, and should be of convenient size, such as 6 ins. by 4 ins.

(To be continued)

Zoning the Food Supply

THE Ministry of Food's Sector Scheme, which comes into force on August 24, constitutes a veritable revolution in food distribution. The scheme is the first step to secure transport economies in wholesale distribution of groceries and provisions. It is significant that further steps are being investigated by the Ministry. These include the zoning of distribution of manufactured goods and a reduction of cross-hauls within sectors.

The country is to be divided into nine sectors. Traders selling by wholesale may sell only to retailers in the same sector. There are certain "neutral" areas where a retailer can get goods from either of two sectors. The wholesaler may also deliver to any customer whose premises are within a radius of forty miles.

Present Scope of the Scheme

The scheme applies to food and drink, including vinegar, spices, condiments and flavouring essences, with certain exceptions. The more important foods excepted are bread, aerated waters, fruit juices and cordials, beer, chocolate and sugar confectionery, fish, fresh fruit, fresh vegetables, fresh meats, liquid milk, mineral waters, poultry, game, rabbits and sausage.

The scheme limits the number of suppliers from whom a retailer may obtain rationed foods. There will be no restriction on the number of suppliers for points foods or on the foods free of any system of rationing. Limitations are:

Not more than one supplier for sugar (except speciality sugar), cooking fats, butter (excluding farm butter), cheese, margarine, eggs, syrup, treacle;

Not more than two suppliers for bacon, tea, if less than 24 lbs. per four-weekly period is sold;

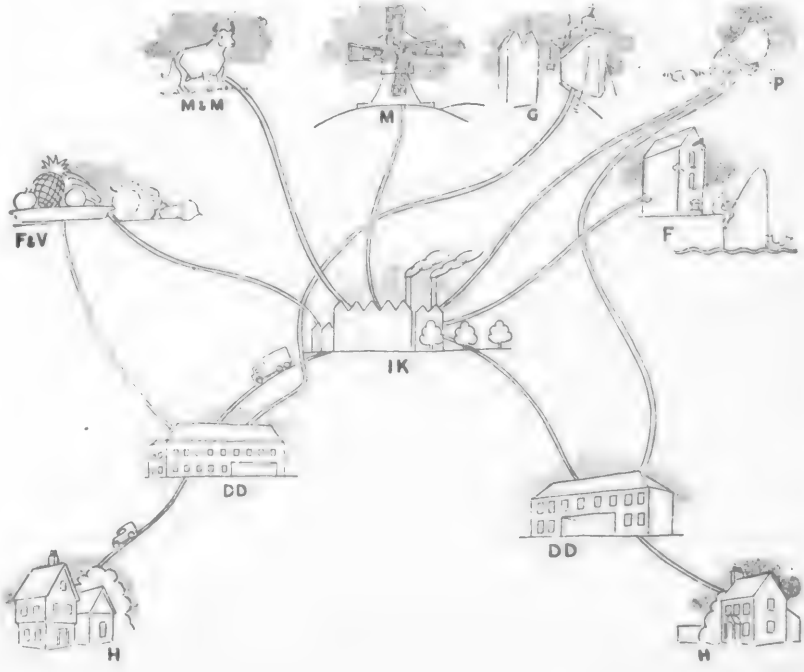
Not more than three suppliers for jam, marmalade, mincemeat, fruit curds, imported honey; and

Not more than four suppliers for tea, if not less than 24 lbs. per four-weekly period is sold.

There can be no doubt that the scheme is one of the most epoch-making pieces of war legislation and worthy of perpetuation. The economies effected should materially reduce the cost of food to the people in times to come.

The Shape of Things to Come

This organisation of food distribution calls to mind an article written in FOOD MANUFACTURE in March, 1937, which commented, among other things, on a scheme proposed by the Atlantic and Pacific chain of stores in New Orleans. The article, which was entitled "The Shape of Things to Come—Planned Food Production and Distribution", contains the following prophetic words: "The time is coming when food manufacturing plants will be strategically located in producing centres." It goes much further than the present scheme in that it predicts that "the day of the vast food organisation stretching from the manufac-



The Shape of Things to Come.

turer to the housewife is coming "—probably more rapidly than most people suppose. The chaotic distributing conditions prevailing in certain sections of the industry and the unhygienic methods used for handling many food products must come to an end.

In its place will arise scientifically planned production and distribution. A diagram, reproduced here, gives an idea of the layout of the scheme. If the word "wholesalers" be substituted for "distributing depôt", it bears a striking resemblance to the sector scheme, although it goes considerably further, as will be seen.

The Industrial Kitchen

"Food manufacturing plants or industrial kitchens (IK) will be located at strategic points throughout the country to serve certain fixed areas. Within the locality served by the industrial kitchen will be set up distributing depôts (DD), their position being determined by distance and density of population. Food products will be sent from the industrial kitchen, where all the processing and manufacturing takes place, to the distributing depôts; from thence will be distributed to the homes, hotels, restaurants, etc., where they will be consumed.

"Certain commodities, such as fruits and vegetables (F & V), eggs (P), tea, coffee, sugar, etc. (G), will go both to the industrial kitchen, where they can be used in processing, and to the distributing centres to be delivered direct to the consumer.

"Other commodities, such as beef, mutton, pork (M & M), flour and other meals (M), fish (F), will go straight from the slaughterhouse, the mill or the dock to the industrial kitchen, and there will be prepared ready for delivery to the housewife. Milk will also pass through the industrial kitchen.

"All foodstuffs will be prepared scientifically, freshness will be guaranteed and delivery will be rapid.

"Any surplus will return through the distributing depôts to the industrial kitchen, there to be converted into manufactured foodstuffs or into cattle fodder and fertilisers.

"The whole process will be rapid and there will be no waste. Utopia is just around the corner."

Thus the 1937 "prophecy". As it stands, it means the elimination of the small trader, for whom there is much to be said and whose protection has been the subject of sympathetic discussion in the House of Commons. But progress is an inexorable force, bringing what look like hardships in its wake. If the end of the small shop is necessary it will have to come. Doubtless compensation and the absorption of the energies of the small shopkeeper in other channels would go far in solving his particular problems.

To return to the present scheme, it should obviate much waste of perishable food which occurred under the old one and also close up the enormous gap between producer and retailer.

The statement recently made in the House of Lords that it costs £850,000,000 to distribute £650,000,000 worth of foodstuffs clearly brings out to what extent the food distributory system has deteriorated under peacetime conditions.

The cost of distribution was described by Lord Addison as an absurdity, and Viscount Bledisloe said that the organisation of the distributive trades had given them both an industrial and political power out of all proportion.

The economy effected by the zoning of biscuit supplies alone is expected, according to different reports, to save 12 to 16 million ton-miles a year by road and rail.

The food distribution scheme has grown haphazard. Foods from Newcastle were sent to Cornwall, where similar foods were prepared nearby. This is now going to be put right—it is hoped not just for the time being. Proper food distribution is getting into its stride and it should not be stopped at the present measures. Who would have said in 1937 that the "Utopian" idea put forward then would be realised in many of its essential points in 1942?

Extraction of Carotene from Plant Material

In a recently published method due to L. A. Moore (*Ind. Eng. Chem.* [*Anal.*], 1940, **12**, 726), carotene is extracted by grinding the material in a mortar with sand and then refluxing for one hour with alcohol. W. B. Davis (*News Ed. Amer. Chem. Soc.*, 1939, **17**, 752) had previously used a food blender for cutting up foods prior to sampling, which has now been adapted by L. A. Moore and R. Ely (*Ind. Eng. Chem.* [*Anal.*], 1941, **13**, 600) for the actual extraction. The blender consists of a heavy glass container, of clover-leaf design in cross-section, at the bottom of which is an assembly of knives turned by a motor at a speed of about 10,000 r.p.m. If straight solvents are put in with the sample so that agitation, maceration and extraction could be carried out simultaneously, there is considerable splashing of the solvent, making it impossible to obtain quantitative results. These workers find, however, that using a mixture of 100 ml. of 95 per cent. ethyl alcohol and 75 ml. of petroleum ether produces a thick foam which effectively stops the splashing and allows the instrument to be used in quantitative estimations. On occasions it is necessary to add more alcohol to induce foaming, the lack of which is due to the water in the sample. After the motor has been running for 5 minutes it is shut off, the solid matter allowed to settle and the liquid decanted. The alcohol concentration is brought to about 80 per cent. by the addition of sufficient water, after which the hypophase and epiphase are separated. The residue is washed with petroleum ether, which is then used to extract the alcoholic liquid. This is repeated twice, and the combined washings of petroleum ether are extracted with water several times to remove completely the alcohol present and then evaporated to a low volume. The carotene is then separated from other pigments by passing through a column of dicalcium phosphate, which absorbs the latter, and the carotene solution made up to volume and evaluated with a photoelectric colorimeter. The five-minute blender-extraction is claimed to be as efficient as the sand-grinding and alcoholic-extraction method, taking one hour and twenty minutes. There appear to be indications that the use of mixed solvents is better than the employment of single solvents; for example, only small amounts of lycopene were extracted from tomatoes with alcohol, while the mixture was quite effective. Strangely enough, the tendency to foam is largely limited to the two solvents mentioned above.

Stoneware Pumps for the Food Industry

JOHN DESMOND.

PUMPS play an important part in the manufacture of many different food products, including soups, food pulps, milk foods, fruit juices, meat extracts, vinegar, pickling liquids, gelatinous products and various patent foods. Their principal function is, of course, to increase the rapidity of flow of liquids from one section of the works to another, or from one vessel to another.

More perhaps than with any other single item of equipment, the closest study is essential before a pump is installed, if it is to give trouble-free service. Unless the precise conditions of service are considered in the utmost detail, breakdowns and other difficulties are almost inevitable.

Important Factors

Among the many factors which must be taken into account the following are some of the most important:

(*a*) The precise function the pump is to fulfil in the general processing scheme—*e.g.*, the transfer of a liquid from one vessel to another, feeding filter presses, or circulating in a closed system.

(*b*) The height to which the liquid must be lifted, suction lift and discharge pressure.

(*c*) The chemical composition of the liquid.

(*d*) Its viscosity.

(*e*) Its temperature and whether or not there are considerable temperature variations.

(*f*) Its specific gravity.

(*g*) The nature and extent of any solid matter which may be present in the liquid.

(*h*) Whether the conditions of working are continuous or intermittent.

These factors naturally condition the choice of pump for any particular purpose, whatever the industry concerned, and it is obviously impossible to deal with them in a single short article.

Purity of Products

In considering pumps for use in the food industries, however, yet another point arises, and this is of such vital importance that it merits discussion in greater detail. This is the need for absolute purity of the product; there must be the certainty that those parts of the pump with which the liquid comes into contact will not react in any way on its colour or taste or otherwise contaminate it. The highest standard of cleanliness is also essential.

If the inner part of the pump is not completely resistant to weak acids and similar chemical constituents present in the foodstuff, alteration and deterioration of the latter will almost certainly take place. Even where the plant material is not *visibly* corroded or otherwise affected, a peculiar circumstance often arises where certain metals are concerned. This is perhaps best illustrated by a simple experiment. If a carefully cleaned silver coin is placed in a cup and hot chocolate poured over it, it will be found after a very short time that an unpleasant metallic taste has been imparted to the beverage. None the less, chemical analysis would in most cases fail to show even the slightest trace of the metallic constituent of the coin which caused this change. In a similar way, a seemingly unaccountable deterioration in the quality of a food product may eventually be traced to contact with the metallic parts of pumps, pipelines, valves, tanks and other plant.

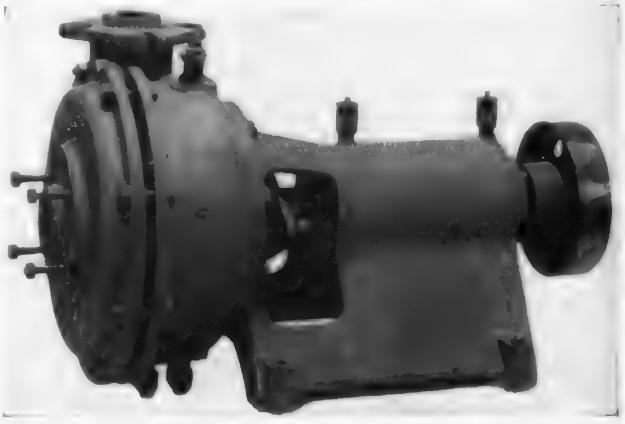
Copper and Iron

It is a well-known fact that copper and iron can produce "tallowy" flavours in milk products, due to catalytic oxidation effects. Iron may also cause the discolouration of tomato juices, canned beets, strawberries and various fruit juices. Aluminium has a particularly noticeable effect on the flavour of many food products, although scientists are still at variance among themselves as to whether or not it has any actual toxic effects.

In recent years there has been a growing tendency in the food industries to make greater use of chemical stoneware plant wherever the conditions of service will permit. Stoneware tanks, pans, transport vessels, store jars, pipelines, valves, cocks, tile linings, cooling coils and mixers are a few of the many items of plant which are now in regular use in almost every branch of food manufacture. It is interesting to note, in this connection, that the war has given a further incentive to this use of stoneware equipment, in order to conserve iron, steel, aluminium and other metals for vital war needs. All the necessary ingredients for stoneware are found in this country and abundant supplies are available.

Resistance to Acids

Stoneware is characterised by its absolute resistance to all acids and other corrosive chemicals, in all con-



Stoneware Centrifugal Acid-proof Pump.

(*Courtesy Royal Doulton Potteries and Pulsometer Engineering Co., Ltd.*)

centrations, with the exception of hydrofluoric acid and hot concentrated caustic alkalis—and these, of course, are not used in the processing of food. As far as food products are concerned, stoneware is completely inert, a factor which is of the greatest possible importance. During the last few years great improvements have also been effected in the mechanical strength of stoneware, particularly its compression and tensile strength and resistance to abrasion. A special grade of ware has been evolved with a very good resistance to thermal shock.

Advances along these lines have made it possible to design special centrifugal and other types of pumps for the food industries in which all the interior parts are lined with a non-porous type of stoneware with a smooth, even finish. This ware has exceptionally high resistance to mechanical shock and to abrasion and can be used at all temperatures up to 100° C. For most purposes, the centrifugal pattern pump is the most useful. The external cover and body of the pump are of cast-iron.

The impeller of this pump is of the single inlet shrouded type, made of accurately ground stoneware, balanced to run without vibration and securely fixed to the spindle. The boss of the impeller extends right through the stuffing box to protect the spindle. The pump is designed with special bearing assembly, comprising a large diameter spindle supported in double ball and bearer rollings and carried in a cast-iron hood. The bearings carry the weight of the rotating parts of the pump without the assistance of an internal bush. The pump can be driven by direct electric motor drive with flexible coupling, by overhung fast and loose pulley or overhung flat or grooved pulley.

It is not suggested that stoneware pumps are applicable to each and every case, but in a large number of cases it will be found that a stoneware centrifugal pump—or sometimes a stoneware force pump—is the ideal solution of the food manufacturer's pumping problems.

MINISTRY OF FOOD

Extension of the Food (Restriction on Dealings) Order

THE Minister of Food has made an amendment to the Food (Restriction on Dealings) Order, 1941, by which all traders selling the following goods, otherwise than by retail, must hold licences from June 29, 1942 :

Imported honey.
Mincemeat.
Fruit curd.

The amending Order provides that anyone who is already licensed to trade otherwise than by retail in jam may trade otherwise than by retail in the above foods without applying for a further licence. Only those who do not hold licences for jam need, therefore, apply for licences under the new Order.

The Order also provides that manufacturers who are licensed under the Mincemeat and Fruit Curd (Control and Maximum Prices) Order, 1941, to manufacture mincemeat or fruit curd, or who are permitted by that Order to manufacture these commodities without a licence, may sell, otherwise than by retail, their own products to any person. It is emphasised that persons such as bee-keepers who only sell home-produced otherwise than by retail are not required to hold licences.

As with other commodities for which licences have been issued under the Food (Restriction on Dealings) Order, retailers who do a wholesale trade in the above items need not apply for licences provided that retailing is their principal business and that they and the retailers to whom they sell hold retail licences under the Food Control Committees (Local Distribution) Order, 1939, for these commodities.

Wholesalers and packers of imported honey and wholesalers of mincemeat and fruit curds should, if they do not hold a licence to trade in jam, obtain without delay the necessary application form from the Wholesale Co-ordination Division, St. Tudno, Colwyn Bay.

Traders should note that a licence granted under the Food (Restriction on Dealings) Order, 1941, in any food does not qualify the holder to obtain any particular terms in that food or guarantee supplies.

An opportunity has also been taken in this amending Order to issue General Licences under which a flour factor licensed as such for the purposes of the Flour (Control and Prices) Order, 1941, may sell otherwise than by retail any flour, and a firm which has been licensed to sell cheese otherwise than by retail may sell processed cheese otherwise than by retail.

"Dried Citrus Fruits for Marmalade"

TO THE EDITOR OF FOOD MANUFACTURE

DEAR SIR,—Our attention has been drawn to an article in the June number of FOOD MANUFACTURE entitled " Dried Citrus Fruits for Marmalade ", by W. V. Cruess and James Sugihara.

This article contains several references to " golden shred " type of marmalade being made from dried citrus fruits.

We would point out that the words " golden shred " are the Registered Trade Mark of this Company, and may in no circumstances be applied to any marmalades not manufactured by us. Further, and without expressing any opinion on the methods described in the article in question, we would point out that Golden Shred Marmalade is, and always has been, made entirely from fresh fruit, and no form of preserved fruit has ever been used in its manufacture.

Yours faithfully,
JAMES ROBERTSON & SONS, P.M., LTD.

GOLDEN SHRED WORKS,
BRISLINGTON,
BRISTOL, 4.

EDITOR'S NOTE.—The article referred to was written in the U.S.A. and reprinted as such. It describes a series of experiments with the possible use of dehydrated fruits for marmalade. The results of these experiments were recommended by the authors to the British Buying Commission for consideration. There was no suggestion that any type of British marmalade is being made with dehydrated fruits, much less that " Golden Shred " marmalade is or will be made from the product described. The reference to different types was evidently made to give the reader some idea of what the finished experimental product looked like.

However, we publish the above letter in order that no misinterpretation of what was written can possibly occur.

Chromatographic Adsorption Analysis

LESS than forty years ago a Russian botanist, M. Tswett, devised a method of separating substances which were closely related chemically and which had not till then been separable by chemical and physical means. He applied it chiefly to mixtures of carotenoids such as are obtained in a petroleum ether extract from dried leaf tissue. The solution was passed through a tightly packed column of dry chalk in a test tube about 0·5 in. diameter and 6 in. long, perforated at the base and fused to a narrow glass tube which fitted into the rubber bung of a suction flask.

Two green pigments were adsorbed in separate layers, chlorophyll β above chlorophyll α near the top of the column, then several xanthophyll layers lower down, while carotene still in solution passed through into the suction flask below. Further separation of the layers was achieved by washing with pure solvent.

The formation so obtained was called a chromatogram and the technique of separation, chromatography. Unfortunately nothing has been heard of Tswett since the war of 1914-18, but twenty years ago workers on the carotenoids and vitamin A began to use his technique, which was found so valuable that nowadays it is applied not only to the separation of coloured substances but to that of colourless ones, with the help of such devices as illuminating the column with ultraviolet light (to make certain substances fluoresce), locating the colourless adsorbate with respect to coloured adsorbates, the formation of coloured products before or after adsorption or the use of adsorbents that yield coloured products with the adsorbates.

Expansion of Technique

The technique has been expanded to the use of a very large number of adsorbents and solvents to meet various requirements. It has been applied to the separation of some inorganic substances and of substances in all fields of organic and physiological chemistry: aliphatic compounds, terpenes, benzene derivatives, aromatic-aliphatic compounds, condensed polycyclic compounds, sterols and related compounds, heterocyclic nitrogenous bases, fat-soluble and water-soluble vitamins, animal and plant hormones, enzymes, coenzymes and proteins, anthocyanins, pterins, chlorophylls, derivatives of hæmoglobin, bile pigments, carotinoids, coal-tar dyes and various natural substances.

It has industrial uses also—*e.g.*, in the detection of adulteration, in distinguishing between natural and synthetic tanning materials, natural and artificial colouring matters, etc. In fact, the possibilities of its use seem to be unlimited.

The book* under review considers the theoretical as well as the practical side of the subject. The reviewer has detected only one slip. It is stated on page 104 that "both 7-dehydro-cholesterol and ergosterol may be regarded as provitamins D_2". The former is provitamin D_3, the latter is provitamin D_2.

* *Chromatographic Adsorption Analysis.* Harold H. Strain, Ph.D. Vol. II. of Chemical Analysis. A Series of Monographs on Analytical Chemistry and its Applications. Pp. 222+x. 22s. 6d.

Details of successful experiments already carried out are given clearly and concisely, and numerous suggestions for further use of the technique are made.

The book will be invaluable not only to those chemists who are already familiar with the subject, but also to those who have not applied it to their work and wish to do so. The print, diagrams and binding are very good indeed.

KATHERINE COWARD.

Canned Meats

(*Continued from page* 184)

1. Incipient spoilage of the product after processing due to under-processing or leakage.
2. Incipient spoilage of the product prior to processing due to delays between closure and processing of the cans.

Swells Indicate Spoilage

Round cans with both ends bulged or convex and oblong cans with the sides bulged are known as "swells". Swells in canned meats result from internal pressure in the can which is greater than atmospheric pressure. Usually swells are produced by spoilage of the product. The vast majority of swelled cans of meat are spoiled. There are a few exceptions to this general rule, such as the following, where the product is sound:

1. Hydrogen swells in canned mince meat, vinegar pickled products, and other acid products resulting from a chemical reaction between the product and the tinplate.
2. Swells resulting from chemical reactions between the ingredients of the product.
3. The factors outlined as causes for springers may also be the cause of swells under extreme conditions which do not cause spoilage.

The contents of swelled cans of meat should be consilered spoiled. It is strongly suggested that the contents of all swelled cans should be examined carefully before they are considered sound and suitable for consumption.

As previously stated, it is not always possible to be certain of the condition of the contents of a can except by examination after the can is opened. However, there is a relationship between the external appearance of canned meats and the soundness of the product. Round cans with normally flat or concave ends, including panelled cans and oblong cans with well-drawn-in sides, can be assumed to contain sound product. Normal cans, even if moderately dented or buckled, can be considered sound provided time has elapsed after the occurrence of the abnormal condition for spoilage to develop. Springer or flipper cans may contain either sound or spoiled product depending on the cause of the pressure within the can. For safety, contents of springer or flipper cans should be considered spoiled until examination of the product proves it to be sound. As nearly all swelled cans contain spoiled product, the contents of such cans should not be considered safe.

The National Bread

From Mr. H. S. Redgrove

TO THE EDITOR OF FOOD MANUFACTURE

DEAR SIR,—One fact emerges very clearly from contributions on the subject of bread published in FOOD MANUFACTURE and other journals, and that is—doctors disagree.

Nevertheless, on the basis of unproven and debatable theories, forty million people are being made the subject of a dietetic experiment, and, if the Government does not amend its policy, will be the subject of a still more hazardous one.

Whether brown bread plain or adulterated with chalk is dietetically superior to white bread or not, the fact remains that the majority of folk in this country prefer white bread. To force them to consume brown bread as an alternative to starvation is a completely undemocratic measure unpleasantly reminiscent of Nazi methods. I find, as a result of questioning numerous persons belonging to diverse strata of society, that the general reaction to the Government's new bread is unfavourable. Where it is otherwise, further questioning usually reveals the fact that the persons concerned were habitual eaters of brown bread. Unfortunately, however, the distaste for the new bread is accompanied by a spirit of resignation. "Better put up with the nasty stuff than be compelled to raise the hand and shout 'Heil, Hitler!'" is a too frequent reaction, which attributes to the Government a degree of omniscience which it emphatically does not possess. The failure of vitamin B policy and wastage of public money in connection therewith, to which Sir Ernest Graham-Little has caustically referred, is evidence of this.

Surely, as a means of conserving supplies of wheat, the rationing of white bread and other white flour products would have been a better alternative. At any rate, the public has never had an opportunity of stating which plan would be preferred.

The experiments on the digestibility of the new bread conducted by Drs. H. A. Krebs and Kenneth Melanby, reported in your May issue, make me smile, for how can one draw any useful conclusions regarding forty million persons from experiments conducted on six? It would not be a difficult task to produce six other persons who would give quite different reactions from those recorded.

Statistics relating to the whole population are of far more scientific value than the results of experiments conducted on a few individuals; and the fact is indisputable that, when the population of this country developed a general liking for white bread instead of brown, there was a marked decrease in the occurrence of urinary calculi. To adulterate brown bread with chalk surely increases the danger of a big increase in this distressing complaint.

An unpleasant feature of the Government's proposal is that the public is not told what this is in terms which can be generally understood. It is pretty obvious, from a question recently asked in the House of Commons, that, in spite of claims concerning modern education, few folk know what calcium is. Why does not the Government plainly say: It is proposed to make you eat chalk with your bread? Why must words such as "calcium" and "creta præcipitata" be employed? Does the Government fear that those very numerous members of the public who, on medical advice, have installed domestic water softeners to remove injurious chalk from their drinking water might begin to think furiously?

I am, etc.,
H. S. REDGROVE.

From Mr. Thomas H. Fairbrother

TO THE EDITOR OF FOOD MANUFACTURE

SIR,—I will endeavour to reply to Sir Ernest Graham-Little's circumlocutory letter in your June issue as briefly as possible. It contains so many quotations and references to other people's work that one has difficulty in determining which is Sir Ernest's specific contribution and which not. He is not prodigal in the use of quotation marks.

If the use of wholemeal bread would not mean a deficiency of calcium, why did the Ministry of Food insist on the addition of 7 ozs. chalk per sack of flour the moment 85 per cent. wheatmeal was introduced, let alone wholemeal? If there would be no deficiency caused, why add it? and if there was a deficiency before, why wasn't it added to white flour? On the question of nutritive value of wholemeal, I will venture to copy Sir Ernest by quoting Professor Drummond. At the meeting of the Royal Society of Arts held on May 6, 1942, in reply to a question, he said: "As the extraction is increased over 85 per cent. a larger proportion of bran inevitably comes into the flour, and that tends to make the utilisation of nutrients less; in other words, whereas one may get the maximum digestibility in flours *up to about 85 per cent.*, the proportion digested tends to fall steadily after 85 per cent. In the case of 90 or 95 per cent. flour there is a relatively poorer utilisation of nutrients than with an 85 per cent. flour." (The italics are mine.) Sir Ernest states that I have assumed that wholemeal bread is a positively dangerous product requiring the artificial addition of calcium to make it safe. I challenge Sir Ernest to quote (and this time use quotation marks) any statement of mine where I have stated that wholemeal is a positively dangerous product. I have merely stated that the amount of calcium available to the body is less when wholemeal is used instead of white flour. This is supported by the statement of Professor Drummond I have just quoted, and admitted by the powers that be in the compulsory addition of 7 ozs. per sack to wheatmeal, and presumably the amount would be increased in the case of wholemeal. In a recent issue of the *Lancet*, Dr. R. A. McCance and Miss Widdowson describe experiments on men and women that prove that the iron in brown bread (they used 92 per cent. extraction) is not nearly so available to the body as that contained in white bread. In other words, although iron may be present in greater amounts in wholemeal than in white flour, it is rendered unavailable presumably owing to the insolubility of ferric phytate.

It is interesting to note how Sir Ernest Graham-Little will avidly swallow any statement which appears to support his argument, and as violently repudiate any that is in opposition to his views. This savours more of the politician than the scientist. He accepts, presumably without any practical confirmation, Dr. Wokes' statement that dried potato slices can replace cereals in the diet of cows and hens, and yet he categorically denies the accuracy of Dr. Norman Wright's statements on the nutritive value of cereals to cattle. Have Dr. Wokes' experiments been carried out long enough to decide whether the potato diet has any deleterious effect on the yield and composition of the milk and eggs produced? Potatoes contain little else than starch and water, and the animals would be deprived of the proteins and fats present in millers' offals. Hutchinson and Mottran, in their book *Food and the Principles of Dietetics*, state in regard to a potato diet: "The result of its continued use would be an undue burdening of the stomach and bowels, culminating in a dilatation, if not disease of these organs. It must be borne in mind that the nitrogen is not in the form of protein. The chief is asparagine, which has no nutritive value at all." Before we should accept the substitution of potatoes for cereals in animal diet, one feels that considerably more trials over a much more extended period should be made. This is in no way denying or belittling Dr. Wokes' work—it is merely asking for more extended investigation. Changes in diet do manifest their results very rapidly.

With regard to Sir Ernest's second paragraph, I do not know whether he is quoting Professor Drummond's words as a supporting argument for stone-ground flour. If he is, I can quote a much more recent statement of Professor Drummond against this. At the Royal Society of Arts meeting referred to above, he was asked whether there was any nutritional advantage derived from grinding wheat between stones as opposed to steel roller mills, and he replied: "I do not think there is any foundation for that at all. There is no advantage to be derived from one mechanical process of milling as compared with another. It is simply a question of what goes into the flour."

Finally, Sir Ernest quotes Mrs. Violet Plimmer as saying: "The real objection to a higher extraction of the grain may be that it is more profitable to sell the impoverished white stuff as human food and the more nourishing brown offals to farmers as animal feeding stuffs." It is as well she said *may* be more profitable. For hers and Sir Ernest Graham-Little's information, I will endeavour by a little simple arithmetic to disprove this.

To-day's price of flour is 33s. 3d. per sack of 280 lbs., and offals are £8 per ton.

Suppose a miller starts with 100 lbs. wheat and converts it to 70 lbs. white flour and 30 lbs. offals, his return would be:

70 lbs. at 33s. 3d. per 280 lbs. = 8s. 4d.
30 lbs. at £8 per 2,240 lbs. = 2s. 1d.

Total 10s. 5d.

If, however, he grinds the lot up to wholemeal flour, he gets 100 lbs. at 33s. 3d. per 280 lbs. = 11s. 10d. By producing the so-called white stuff, he loses 1s. 5d., and far from being a rogue, he is actually a philanthropist!

Yours truly,

THOMAS H. FAIRBROTHER, M.Sc., F.I.C.
Director and Chief Chemist, McDougall's, Ltd.

Bacteriology for the Canning Industry

A Lay for the Layman

With apologies to MR. J. G. BAUMGARTNER*

BACTERIA are small in size,
They haven't any ears or eyes,
Limbs, mouth or teeth, no heads, no necks,
They haven't even any sex.
They eat and eat and breed and breed
With simply horrifying speed.
To breed, they merely split in twain,
And each half into two again
Three times an hour, if things go well.
And so, what was a single cell
At dawn, before the day is done,
Becomes ten thousand million.
Mild warmth promotes those large increases,
When very cold all function ceases,
And though their tempers may be placid
They don't like dryness, heat, or acid.
Sugar or salt, mixed with their diet,
If there's enough, will keep them quiet;
But if the concentration's low
Sugar alone helps some to grow,
While only things which poison us
Will kill the wily bacillus.
And that is why the rule holds good
We cannot sterilise our food
With chemicals, dilute or neat,
But only by the use of heat.
Made visible, these tiny germs
Resemble sausages or worms,
But they are so extremely small
We cannot see the things at all
Unless they're highly magnified
And with gay colours brightly dyed.
Yet there are millions everywhere
On everything, and in the air,
In every can, in every jar,
Despite precautions, there they are,
And if they're not too cold or dry
They start at once to multiply.
But "processing" they can't endure
Unless the time and temperature
At which they're processed aren't just right.
Mistakes like that are their delight
Because a few will then survive
By forming spores, which keep alive,
And in a little while will start
Once more to play their noxious part,
Spoiling good wholesome food, which thus
Is often rendered poisonous.
Only when the processing is done
With utmost care will there be none
Left living, to originate
Sad trouble at a later date.

J. H. FILDES.

* *Author of an article on the subject, written for the layman.* (FOOD MANUFACTURE, *Pt. I, March*, 1942; *Pt. II, April*, 1942.)

The Determination of Alcohol and Extract in Wine

The author describes his search for a new formula, based on refractive index and density, covering the whole range of all practically occurring concentrations of alcohol and extract in wine within a small limit of error.

Dr. P. F. FISCHL.

FOR THE determination of alcohol and extract in wine the usual distillation method is a lengthy process and much time is wasted with routine analytical work. So point out W. Newton and F. L. Munro when describing a method using the density and refractive index.[1] It is in fact surprising that, though many authors have occupied themselves with the development of new and quicker methods for the determination of alcohol in wine, none seems to have been really satisfactory as none has so far succeeded in replacing the old, time-honoured method of distillation.

As one who has to devote much of his time to these determinations, the author welcomed Newton-Munro's new method as a most promising step towards a quicker and still reasonably correct analysis of alcohol and extract in wine. It was found however that, though the alcohol content determined by the method was reasonably satisfactory for dry wines, the method became almost useless for the very sweet wines of the port type, and the results for extract differed in very much the same way.

This was confirmed by Cruess-Joslyn-Saywell,[2] who suggest that this is probably due to the fact that the formula was devised for dry wines of about 14 per cent. alcohol by volume. This is actually confirmed by the original publication of Newton-Munro, who suggest that, because the relation between density and both alcohol and extract content is not strictly linear, it is impossible to develop one single formula that will satisfactorily cover the entire range of alcohol and extract contents of wines.

Newton-Munro chose, therefore, as constants for their formula :

$$C_1 = 0{\cdot}0006 \qquad C_2 = 0{\cdot}0015$$
$$C_3 = 0{\cdot}0012 \qquad C_4 = 0{\cdot}0041$$

where C_1 represents the amount by which the refractive index is raised by each 1 per cent. of alcohol, C_2 the amount by which it is raised by each 1 per cent. of extract, C_3 the amount by which the specific gravity is lowered by each 1 per cent. of alcohol, and C_4 the amount by which it is raised by each 1 per cent. of extract.

Substituting these values in the general equations—

$$r = C_1X + C_2Y \text{ and } s = -C_3 + C_4Y,$$

where X is the percentage of alcohol, Y the percentage of extract, r the refractive index of the wine minus the refractive index of water, s the specific gravity of the wine minus the specific gravity of water, they develop these formulæ :

$$X = 962{\cdot}5\,r - 352{\cdot}2\,s$$
$$Y = 281{\cdot}6\,r + 140{\cdot}8\,s.$$

The determination of r and s is made at 20° C., a Zeiss-Abbé refractometer being used for the determination of the refractive index.

This formula, said to have been developed for a wine containing about 14 per cent. alcohol and 6 per cent. sucrose, is alleged to give good results over a range of alcohol contents from 9 per cent. to 34 per cent. and over a range of sugar concentrations from 2 per cent. to 20 per cent.

Comparing, however, results calculated with this formula with values estimated by the official method, Newton-Munro admit for alcohol an average difference of less than 0·4 per cent. with a maximum difference of 1 per cent. For extract the average difference was found to be 0·7 per cent., with a maximum difference of 1·4 per cent.

The author does not think such results are satisfactory, not even as suggested, for plant control purposes. Whilst admittedly the average difference, 0·4 per cent. and 0·7 per cent. respectively, compares quite well even with the official method, one must bear in mind that it is the maximum difference that really matters in this particular case. The reason for this is that, whereas the limit of error in other analytical methods is mainly due to possible errors in manipulation during the process of analysis, the error in this particular case is due mainly to the structure of the formula on the one hand and to the sugar and alcohol content on the other. This is all the more unfortunate, as it is reasonable to expect that errors due to manipulation are much smaller in the determination of these two precise physical constants than they are in the execution of the official distillation method.

Having thus come to the conclusion that Newton-Munro's formula as such was not fully satisfying, the author tried to find a new formula based again on refractive index and density but covering the whole range of all practically occurring concentrations of alcohol and extract in wine within a smaller limit of error.

For this purpose the graph for the refractive index and specific gravity, both for alcohol and sucrose, and their relation to each other has been closely studied. Furthermore, refractive indices have been compared with their corresponding reading on the scale divisions of an immersion refractometer. The relation between refractive index and corresponding scale divisions is not strictly linear.

It has been found that, though admittedly therefore neither the graphs themselves nor their relation to each other is linear, the deviations compensate each

other to such an extent that $r-s$ gave a constant of sufficient accuracy, related directly to the alcohol content of the sample. In the same way, $r+s$ gave a constant directly related to the sucrose content.

$$r-s=\frac{X}{360}$$

$$r+s=\frac{Y}{120}$$

Therefore:

$$X=(r-s)360$$
$$Y=(r+s)120$$

where: X = per cent. alcohol by volume,
Y = per cent. extract by weight,
gravity of water,
r = reading on scale divisions of immersion refractometer for wine minus reading for water on same scale.
s = sp. gr. of wine minus sp. gr. of water.

NOTE.—r in the above formula relates to the scale reading of an immersion refractometer (Bellingham and Stanley or Zeiss) and *not* to the actual refractive index. Should in some case the refractive index exceed the range of the instrument, the sample must be suitably diluted. The immersion refractometer has a range up to 1·366. The reading for water is 14·5° on the scale, measured at 20° C.

To test the formula, results have not in the first place been compared with the distillation method, but it was thought to be even more illuminating to compare them with the actual theoretical values for wines of varying alcohol and sugar content.

For this purpose, refractive index and specific gravity have been calculated for a number of imaginary wines, the immersion refractometer reading calculated from Hubner's table for sucrose and B.H. St. John's table for alcohol, the specific gravity from Domke's table for sucrose, and from the table compiled at the U.S. Bureau of Standards for alcohol.[3]

Table I gives some of these values, together with calculated results and indicating the limit of error for a number of concentrations, all of various strength and proportion between alcohol and sugar, covering a range from 10 per cent. to 25 per cent. of alcohol and 3 per cent. to 20 per cent. of sucrose.

The average difference for alcohol was found to be slightly over 0·2 per cent., with a maximum of 0·5 per cent.

The average difference for extract was found to be slightly over 0·3 per cent., with a maximum of 0·8 per cent.

Practical tests made with wines covering a similar range of alcohol and extract concentrations fully confirmed this, and results agreed closely within the theoretical limit of error. The determination of r and s was made at 20° C. A Bellingham and Stanley immersion refractometer was used for the determination of r.

Summary

Based on Newton-Munro's method for the determination of alcohol and extract in wine by means of density and refractive index, but using the scale reading of an immersion refractometer instead of the actual refractive index, a new formula has been devised, covering all practically occurring ranges of alcohol and sugar concentrations in wine.

Results calculated with this formula have been compared with theoretically calculated values for refractometer reading and specific gravity for a number of imaginary wines of varying alcohol and sucrose content, and have been found to be correct within a maximum difference of 0·5 per cent. for alcohol and 0·8 per cent. for extract content.

Practical tests fully confirmed the theoretical considerations. A Bellingham and Stanley immersion refractometer was used for the determination of r.

The results compare favourably with Newton-Munro's limit of error, apart from the fact that the new formula is simple and easy to calculate.

The formulæ devised are:

$$X=(r-s)360$$
$$Y=(r+s)120$$

where: X = per cent. alcohol by volume,
Y = per cent. extract by weight.
s = specific gravity of wine minus specific gravity of water, both at 20° C.,
r = reading on scale divisions of immersion refractometer for wine minus reading on same scale for water, both measured at 20° C.

TABLE I

Assumed.		*Corresponding Theoretical Values.*				*Calculated.*		*Difference.*	
X	Y	r	s	$r-s$	$r+s$	X	Y	X	Y
10	3	250	−36	286	214	10·3	2·6	+0·3	−0·4
10	10	524	246	278	770	10·0	9·2	—	−0·8
10	15	736	457	279	1193	10·0	14·4	—	−0·6
10	20	966	675	291	1641	10·5	19·7	+0·5	−0·3
15	3	326	−94	420	232	15·1	2·8	+0·1	−0·2
15	10	600	188	412	788	14·8	9·5	−0·2	−0·5
15	15	812	399	413	1211	14·9	14·5	−0·1	−0·5
15	20	1042	617	425	1659	15·3	19·9	+0·3	−0·1
20	3	406	−148	554	258	19·9	3·1	−0·1	+0·1
20	10	680	135	545	815	19·6	9·8	−0·4	−0·2
20	15	892	345	547	1237	19·7	14·9	−0·3	−0·1
24	3	472	−191	663	281	23·9	3·4	−0·1	+0·4
24	10	746	91	655	837	23·6	10·0	−0·4	—
25	15	974	290	684	1264	24·6	15·2	−0·4	+0·2

REFERENCES

[1] Newton, W., and Munro, F. L.: The Determination of Alcohol and Extract in Wine by Means of the Density and Refractive Index. *Canadian Chem. and Met.*, Vol. XVII, No. 6, June, 1933.

[2] Cruess, W. V., Joslyn, M. A., Saywell, L. G.: Laboratory Examination of Wines and Other Fermented Fruit Products. The AVI Publishing Co., Inc., New York, N.Y., pp. 49-51.

[3] *Official and Tentative Methods of Analysis.* Third edition, 1930, pp. 504-505, 513, 534-535, 538-553.

Ministry of Food

Latest Statutory Rules and Orders

The list given below is the continuation of the list of Orders published in *Food Manufacture*, June 1, pages 173-174.

No.	*Date.* 1942.	PRICE FIXATION ORDERS
365	Mar. 2.	Amending the Feeding Stuffs (Maximum Prices) Order, 1941.
416	,, 6.	General Licence under the Bread (Control and Maximum Prices) Order, 1941. (1941, No. 1542.)
418	,, 7.	Oranges (Maximum Prices) Order, 1942. (Revokes S. R. & O., 1941, No. 982.)
419	,, 7.	Directions under the Jam (Maximum Prices) (No. 2) Order, 1941. (1941, No. 1736.) (Name and address of manufacturer.)
451	,, 11.	Amending the Flour (Control and Prices) Order, 1941.
453	,, 11.	Amending the Bread (Control and Maximum Prices) Order, 1941.
471	,, 13.	Amending the Dried Fruits (Control and Maximum Prices) Order, 1942.
472	,, 13.	Amending the Oats (Control and Maximum Prices) Order, 1941, and the Oats (Control and Maximum Prices) (Northern Ireland) Order, 1941.
473	,, 13.	Amending the Home-Grown Wheat (Control and Prices) Order, 1941.
474	,, 13.	Amending the Home-Grown Wheat (Control and Prices) Order, 1941, the Oats (Control and Maximum Prices) Order, 1941, the Oats (Control and Maximum Prices) (Northern Ireland) Order, 1941, the Barley (Control and Maximum Prices) Order, 1941, the Barley (Control and Maximum Prices) (Northern Ireland) Order, 1941, the Home-Grown Beans (Control and Maximum Prices) Order, 1941, the Home-Grown Rye (Control and Maximum Prices) Order, 1941, the Home-Grown Dredge Corn (Control and Maximum Prices) Order, 1941, and the Home-Grown Beans (Control and Maximum Prices) (Northern Ireland) Order, 1941.
476	,, 13.	Green Onions (Maximum Prices) Order, 1942. Revokes S.R. & O. 1941 No. 1031 and 1279 in so far as they apply to Great Britain.
477	,, 13.	Home-Grown Cucumbers (Maximum Prices) Order, 1942.
478	,, 14.	Amending the Eggs (Control and Prices) (No. 3) Order, 1941.
495	,, 17.	Amending the Straw (Maximum Prices) (Northern Ireland) Order, 1941.
496	Mar. 17.	Amending the Rice (Maximum Prices) Order, 1941.
524	,, 19.	General Licence under the Oat Products (Control and Maximum Prices) (No. 2) Order, 1941. (1941 No. 2140.) (Midlothian Oatflour.)
526	,, 19.	Amending the Straw (Control and Maximum Prices) Order, 1941.
532	,, 21.	Amending the Eggs (Control and Prices) (Northern Ireland) (No. 3) Order, 1941.
		FEEDING STUFFS
546	Mar. 24.	Amending the Directions, January 31, 1942, under the Feeding Stuffs (Rationing) Order, 1942.
609	,, 31.	Amending the Compound and Mixed Feeding Stuffs (Control) (No. 2) Order, 1940, and giving Directions thereunder.
		GENERAL
437	Mar. 10.	Amending the Food Control Committees (Local Distribution) Order, 1939, and the Food Control Committees (Licensing of Establishments) Order, 1941.
494	,, 17.	Retail Prices (Notices) Order, 1942.
501	,, 19.	Amending Regulations 55 and 90 of the Defence (General) Regulations, 1939. (Penalties.)
525	,, 19.	Acquisition of Food (Excessive Quantities) Order, 1942.
531	,, 21.	Sampling of Food Order, 1942.
560	,, 25.	Coffee Essence (Control) Order, 1942.
595	,, 30.	Seizure of Food Order, 1942.
		MEAT
274	Feb. 14.	Amending the Bacon (Addition of Borax) Order, 1940.
		VEGETABLES
457	Mar. 12.	Amending the Potatoes (1941 Crop) (Control) (No. 2) Order, 1941, and giving Directions thereunder.
537	,, 23.	The New Potatoes (Prohibition of Sales) Order, 1942.
538	,, 23.	Amending the Directions, dated February 4, 1942, under the Potatoes (1941 Crop) (Control) (No. 2) Order, 1941, and giving further Directions thereunder.

News from the Industry

MINISTRY NEWS

Dried Chicory

Dried chicory must not be used except in the manufacture of coffee essence, or bought except by a licensed manufacturer of such essence. This order dates from June 1.

* * *

Purchase of Canadian Wheat

The Ministry of Food of the United Kingdom has entered into another agreement with the Canadian Wheat Board to purchase Canadian wheat. The new contract, like the last one of November, 1941, is for 120 million bushels.

* * *

Resignation

Mr. Alex. J. Parnell, for personal reasons, has resigned from the position of Assistant Director of Coffee in the Ministry of Food, and has returned to London from Colwyn Bay. He will continue to act as Honorary Trade Adviser for Coffee.

* * *

Food Prosecutions

During April, 1942, there were 2,487 prosecutions under the Food Control Orders, of which 2,323 (93·41 per cent.) were successful. These prosecutions were taken against wholesalers, retailers, members of the public and other offenders against food regulations. 278 wholesalers, 989 retailers, and 1,056 other offenders were convicted.

* * *

Food Transport Order

The Minister of Food has made directions under the Food Transport Order by which no one may, except under licence, transport any oatmeal, oat flakes, or oat flour from Great Britain to Northern Ireland. This step has been taken as a measure of transport economy. Any inquiries about the operation of the directions should be addressed to the Cereal Products Division, Mount Stewart, Colwyn Bay.

Sugar for Rearing Queen Bees

The Ministry of Food announces that Food Executive Officers have been authorised to issue between now and July 18 next permits for sugar, up to 5 lb. per nucleus, to bee-keepers for the purpose of rearing queen bees only.

Applications should be made to local Food Offices on the appropriate form, which must be countersigned by the Secretary to a County Bee-keepers' Association.

* * *

OBITUARY

Miss Helen Tress

Miss Helen Maud Tress, who died at Thame, Oxfordshire, on Friday, at the age of 44, had been for about a year the head of the Food Advice Division of the Ministry of Food.

Mr. Howard Marshall, Director of Public Relations, Ministry of Food, writes to *The Times*:

"Helen Tress, whose tragically sudden death has so shocked her colleagues at the Ministry of Food, was a remarkable personality. The war brought her into Government service, and her rare gifts swiftly caused her to be entrusted with the development of a new service of food advice to housewives. Technically she was admirably qualified for this important work, having been for many years lecturer in Household Arts at King's College for Women. It was, however, her personal qualities which gave to her work so great a measure of inspiration. She saw in the Food Advice movement an opportunity for service to the community. She realised that the guidance she was able to give to housewives through her Food Advice centres would result in better standards of living. She was passionately sincere and entirely selfless in her approach to the problems created by wartime conditions. Her humour, her enthusiasm, her wide humanity, and her energy will be sadly missed by all those who were privileged to work with her."

Pickles and Sauces

The Minister of Food has made an Order to amend the Pickles and Sauces (Control and Maximum Prices) Order, 1942, S.R. and O. No. 594.

The date from which pickles and sauces may not be sold without a label stating the maximum retail price has been postponed to July 20; this date has been substituted for June 16 at all places in the Principal Order where the latter date occurs.

The responsibility for bearing the cost of returning empty containers now devolves upon the seller.

In the invoicing of pickles and sauces it becomes no longer necessary for the first-hand sale prices to be stated, except in respect of statements relating to first-hand sales.

* * *

Processed Cheese

The Minister of Food has made an Order reducing, from June 22, the maximum wholesale price of processed cheese in portions or blocks weighing over 3 ozs. to 99s. 2d. per cwt. From the same date the maximum retail price of such cheese will be reduced to 1s. 1d. per lb. The maximum prices of small portions weighing 3 ozs. or under will be reduced to the same levels from July 27. Traders holding stocks of processed cheese acquired at higher prices should, therefore, note these dates carefully in order to be sure of disposing of their stocks before the new maximum prices come into force.

The Ministry has also made arrangements for the concentration of the processed cheese industry. Production has, since April 30, been restricted to a small number of factories in different parts of the country. The production of small portions and packets of processed cheese has stopped. Such cheese as will continue to be processed in bulk sizes will be manufactured on behalf of the Ministry, which will take over its distribution in the same way as that of ordinary cheese as part of the ration.

Divisional Food Organisation

The Minister of Food has approved the following changes in the Divisional Food Organisation: Mr. J. R. P. Postlethwaite, C.B.E., to be Divisional Food Officer, London, on transfer from the South-Eastern Division, following the transfer of Mr. W. H. Kirby to the Board of Trade. Mr. E. L. Rabone, M.C., J.P., to be acting Divisional Food Officer, Midland Division, following the resignation of Major A. H. S. Waters, V.C., D.S.O., M.C., J.P. Mr. Rabone served previously as Deputy Divisional Food Officer, Midland Division. Major F. V. Shaw, D.S.O., M.C., to be Deputy Division Food Officer, Liverpool, to succeed Mr. J. W. Cornes, who is resigning. Major Shaw has been seconded for duty under the Ministry of Food by the Royal Insurance Company.

* * *

Immature Fish

The Minister of Food, after consultation with the Government Departments responsible for Fisheries in England and Wales, Scotland, and Northern Ireland, has decided to prohibit the sale for human consumption of certain classes of fish less than 7 inches in length. An Order to this effect came into force on June 1, 1942.

The restriction will not apply to herrings, or such fish as sprats, pilchards and whitebait, which, although less than 7 inches in length, are not immature fish, and have definite food value. The fish to be kept off the market are those classes which have little or no food value, should preferably not be landed, and which do not justify the labour and transport in getting them to market.

The Order will, it is hoped, discourage the landing of fish which if left in the sea would be a potential addition to future food supplies.

* * *

Not Sterile ?

The Ministry of Food states that tinned food—in particular fish, milk, fruits, vegetables, soups, and all kinds of meat—is likely to be spoiled if left in the sun, and should not be used by retailers for window dressing in hot weather.

Cattle Hides

The Minister of Supply has issued the Control of Native Cattle Hides (No. 4) Order, 1942, revising the schedule of maximum prices which may be paid for United Kingdom cattle hides.

Copies of the Order (which comes into effect as from May 30, 1942) may be obtained (price 1d.) from H.M. Stationery Office, York House, Kingsway, London, W.C. 2, or through any bookseller.

* * *

Control of Carrots

The Minister of Food has revoked the Home-Grown Carrots (1941 Crop) (Control) Order as from June 1, 1942. Growers are, therefore, released from their obligation to sell carrots to the National Vegetable Marketing Company from this date.

All communications about the 1942 carrot crop should be addressed to the Potato Division, St. John's College, Oxford.

* * *

Canning of Fruit and Vegetables in 1942

The Ministry of Food has announced to the recently inaugurated Canners' (Wartime) Association a canning programme for 1942. The programme is larger in tonnage than that of any preceding year, but in the national interest there will be some shifting or emphasis in regard to the products to be canned.

There will be a prohibition as was in force last year on the canning of certain fresh fruit which is required for jam-making. Plums, and to a limited extent loganberries, blackberries, apples and rhubarb will be canned.

There will be no canning allowed of fresh vegetables (including peas) or of processed peas, except to meet the demands of the Services and except to the extent necessary to maintain the structure of the industry in an interim period.

In view of the need to conserve tinplate it has become necessary to state a priority programme for commodities the canning of which will be permitted.

The canning of certain vegetables is still going on and no Statutory Order has yet been made by the Minister to limit their production.

Preventing Potato Waste

To enable best use to be made of available supplies, the transport of potatoes into or between the following areas is now prohibited except under permit:

Area 1: London, Hertfordshire, Essex, Kent, Surrey, Sussex, Buckinghamshire, Berkshire, Middlesex, Oxfordshire. Area 2: Dorset, Gloucestershire, Hampshire (including Isle of Wight), Somerset, Wiltshire. Area 3: Cardigan, Carmarthen, Glamorgan, Hereford, Monmouth, Pembroke, Radnor, Brecon. Area 4: Cheshire, Lancashire, Denbigh, Flint, Caernarvon, Anglesey, Cumberland, Westmorland. Area 5: Worcester, Warwick, Stafford, Shropshire. Area 6: Cornwall, Devon, Area 7: Yorkshire, Durham, Northumberland.

Transport within the areas is unrestricted, but is subject to the existing restrictions on forwarding by rail to certain stations in the Birmingham, Manchester and Newcastle districts. By this system the Food Ministry will try to ensure that potatoes which are sound, but not of the best keeping quality, will be used before longer-keeping classes. This will avoid food wastage and increase the supply of better-keeping potatoes for use at the end of the main crop season.

* * *

Farming for Schoolboys

All the food produced on Glasgow Corporation's new farming estate of Lawmuir, near East Kilbride, will go to the municipal cooking depots to help feed about 10,000 children.

The 200-acre estate was opened on June 6 by Mr. Thomas Johnston, M.P., Secretary of State for Scotland. It will be used as an agricultural school for a large number of boys over fourteen years of age, who will be given expert tuition on all kinds of farm operations.

The area consist of three farms, converted into an agricultural School by Glasgow Education Department, so that city schoolboys will take a course lasting two or three years. The scheme is the first of its kind in the country.

To start with, most of the land will be used mainly for vegetable and fruit-growing, but it is intended to introduce poultry-keeping and other branches of farming into the course of instruction.

A Derris Alternative

Derris root is scarce, but limited supplies of Lonchocarpus (Cubé root) are available. The latter, grown in South America, has insecticidal properties similar to Derris. Growers, therefore, should not hesitate to use preparations made from Lonchocarpus.

* * *

Milk and Sugar

Dairy farmers who have extended their sugar beet acreage this year are, at the same time, also providing feeding-stuffs for the production of more meat and milk. They will have an extra supply of beet tops and beet pulp to feed on the farm—a great help in solving the stockman's winter problems.

* * *

Government's First Call on U.S. Tinned Fish

The entire 1942 supply of tinned salmon, sardines, mackerel and Atlantic herring is to be set aside for the needs of the U.S.A. armed forces and the Lend-Lease programme, in accordance with an order issued by the U.S.A. War Production Board, says Associated Press.

The Board said that the Government would get first choice, and the remainder would be available for civilian consumption.

* * *

Government Control Company

A public company under the title of Praba was registered on April 28 to act as agent for any Government Department empowered to control the supply of fruit and vegetables. The capital is £20,000 in 4s. shares.

The directors are Messrs. John D. Hibberd (director, Henry W. Peabody and Co., of London), Wm. Graham (sole partner, Wm. Graham and Co.), N. S. Mathieson (finance director, Canned Fruit and Vegetable Division, Ministry of Food), W. D. Boltwood (partner in James Gilbertson and Co.), Wm. E. Holmes (director, Alexander Crichton and Co.), H. J. Howse (director, Anderson and Coltman), and Wm. Stirrup (director, Powell Bros. and Co. [London]).

Registered office is Regis House, King William Street, E.C. 4.

Export Groups

The President of the Board of Trade has appointed the following to be members of the Central Committee of Export Groups:

Mr. H. H. Bagnall; Mr. E. Bruce Ball, Ferrous and Non-Ferrous Valves Export Group; Sir John Caulcutt, Banking and Insurance; Mr. Kenneth Chance, Plastics Export Group; Lieut.-Col. G. R. Harding, Food Manufacturers' Export Group; Mr. Herbert Hey, Wool Textile Industry Export Group; Lord Hollenden, Drapers' and Hosiers' (Wholesale) Export Group; Mr. A. Mortimer, Pharmaceutical Export Group; Mr. J. J. Nicholson; Mr. G. W. Odey, Leather Footwear and Allied Industries Export Group; Mr. G. H. A. Sington, Textile Machinery and Accessories Export Group; Mr. E. Raymond Streat, Cotton Board; Mr. V. Watlington, Electrical Machinery Export Group.

* * *

Tin Research Report

In the Tin Research Institute's Report for 1941 it is stated that since Japan began the Far Eastern campaign the main problem has become one of how to make the best use of the supplies available by curtailing the use of tin in commodities not essential to the war effort, by improving the processes in essential uses, and by recovering tin.

For these tasks the Institute has been appointed by the Ministry of Supply to advise on all technical questions affecting the use of tin.

During 1941 its major efforts were concentrated on war problems, on which it is not possible to report in detail. It has assisted the Ministry of Food and the Ministry of Supply in finding a substitute for cereal products used to remove palm oil from freshly made tinplates. Progress has been made in developing a substitute for the palm oil, which is now in short supply.

Although not dealt with in the Report, the most important application of research in electrotinning will soon be seen in the production of specially thinly coated tinplates as a war economy measure, requiring only one-third of the tin used on normal tinplate.

British Standards Institution

The Institution has received a communication from the Minister of Production to the effect that His Majesty's Government recognise the British Standards Institution as the sole organisation for the issue, in consultation with any Government, professional or industrial bodies concerned, of standards having a national application.

In regard to the preparation and issue of codes of practice for building and civil engineering work the Minister of Works and Buildings is making special arrangements by the appointment of a representative committee with which the B.S.I. is fully co-operating.

* * *

War Damage Insurance

The Board of Trade remind traders and other business men that they can insure their stock or business equipment against war damage under the Government insurance schemes, and that unless they do so they are not entitled to claim compensation in the event of war damage.

Traders and others holding stocks worth more than £1,000 (in the case of retailers of foodstuffs more than £200) or having business equipment worth more than £1,000 *must* insure.

Those below the compulsory limits need not insure if they do not wish to do so; but unless they do insure they *will not receive compensation if their stocks or equipment sustain war damage.* Such traders are therefore urged to consider their position most carefully. Applications for insurance should be made to any insurance agent.

* * *

The Institute of Physics

At the annual general meeting of the Institute of Physics, held on May 28 last, the following were elected to take office on October 1, 1942: *President:* Professor Sir Lawrence Bragg. *Vice-Presidents*: Dr. W. Makower and Mr. T. Smith. *Honorary Treasurer:* Major C. E. S. Phillips. *Honorary Secretary:* Professor J. A. Crowther. *Ordinary Members of the Board:* Professor J. Chadwick, Professor J. D. Cockcroft, Mr. D. C. Gall and Mr. E. D. Wedmore.

Canteens for War Workers

Firms engaged in organising and operating canteens, under the Factories (Canteens) Order, 1940, in Admiralty supply, aircraft, munitions and other war equipment factories throughout the country have formed the National Society of Caterers to Industry with head offices at 83, Pall Mall, London, S.W. 1 (telephone, Whitehall 3955).

Mr. H. J. R. Stent, Barker's (Contractors), Ltd., is President of the Society. Members of the Council of the Society are: Messrs. H. J. R. Stent (chairman), Harold Gardner, John Gardner (London), Ltd., D. C. Jenkins, Catering Contractors, Ltd., Alan Hall, K. and A. Hall (Caterers), Ltd., G. A. F. Layton, Factory Canteens, Ltd., N. Abrahams, Staff Caterers, Ltd., H. S. Taylor, Industrial Catering, Ltd., and J. Bindon Moore Company. Mr. L. W. Slark, John Gardner (London), Ltd., is treasurer of the Society. Mr. Arthur Lawson, formerly of the Board of Trade, has been appointed secretary.

A National Joint Industrial Council to secure joint action between employers and employees in the industry has been formed.

Mr. Arthur Lawson and Mr. Pearmaine are joint secretaries of the Council.

* * *

City Analyst's Report

Dr. G. H. Walker, the Salford City Analyst, referring in his report for 1941 to the large number of food substitutes which appeared on the market during the year, states that while only twelve prosecutions were undertaken, resulting in penalties totalling £142 being imposed, steps were taken in a number of other cases to secure either improvement in the product or amendment of the labelling.

Dr. Walker also reports that only fifty samples of milk were found to be adulterated out of 883 examined, a proportion in close correspondence with that of the previous years. Sixty-one samples were, however, certified as naturally deficient in solids not fat, but the Hortvet freezing-point test indicated that they must be adjudged genuine milk.

India to Increase Food Production

A 4 per cent. increase in production of the principal food crops and in the food-growing area under cultivation is the aim set for the Indian Provinces and the States of Hyderabad, Mysore, Baroda, Kashmir, and Indore.

At present the acreage under food crops in the areas concerned is 171,000,000 acres, with an annual produce of 50,000,000 tons. Much of the increased yield is hoped for by April.—*Reuter.*

* * *

Dehydrated Meat for Canteens

Experiments are to be made soon in works canteens in Lancashire with dehydrated meat—meat without the moisture, but still retaining the essential juices, states the *Yorkshire Post.*

Two stones of this new-style meat, which will not be placed on the market for a long time, are being distributed among canteens for test purposes.

Managers will be asked to give their views on the best ways of cooking it, and to make inquiries among their regular customers to find out how it is liked.

When canteen managers were given this news at a meeting in Leeds recently it was stated that the work was being done at the request of the Ministry of Food.

* * *

Saving Tin from Tinplate

A new pewter, 70 per cent. stronger than at present, has been produced by research workers in Great Britain and U.S.A. They have also discovered a new alloy for tailshaft bearings of ships, a substitute for aluminium milk bottle caps, and important improvements in bronzes.

Two groups of workers, the Tin Research Institute in Britain and the Battelle Memorial Institute in the U.S.A., may also be able to reduce by 10 per cent., with very little risk of spoiling food packs, the amount of tin used on tinplate. The knowledge which has been accumulated on the subject on both sides of the Atlantic is proving most valuable now that the war in the Pacific has deprived the United Nations of one of their sources of tin.

Changes of Address

The address of the London office of the Sturtevant Engineering Company, Ltd., has been changed from Bush House, Aldwych, W.C. 2, to: Victoria Station House, 189, Victoria Street, London, S.W. 1. Telephone, Vic. 9201/3.

* * *

The new address of R. Mallinson and Sons is now 150A, Woodhouse Lane, Leeds, 2. Telephone No.: Leeds 28277. For the duration of the war the Butter and Cheese Association, Ltd., are taking over the firm's old premises at 45/47, Greek Street Chambers, Leeds, 1.

* * *

The registered offices and Wembley factory of Citrus Products Co., Ltd., have been transferred to 110, Pratt Street (the building of Idris, Ltd.), Camden Town, London, N.W. 1, the telephone number being Euston 2463. The company has agreed to release its premises for national purposes and with the friendly co-operation of Idris, Ltd., will carry on the manufacture of its products at their premises. This arrangement has been recognised by the Ministry of Food as in the interest of the war effort.

* * *

Pure Tin from Used Cans

A process for recovering tin and steel from used tin cans, requiring no preparation of the cans on the part of the householder, or other users of canned commodities, can now be applied to large-scale production, according to Walten S. Smith, vice-president of the Metal and Thermit Corporation, U.S.A. This company has been operating a test plant at San Francisco for the last five years.

The pilot plant is a complete unit with a capacity of over 6,000 tons. From its operations, suitable methods have been worked out for the recovery of about 24 lb. of tin oxide and almost a ton of scrap steel per ton of discarded cans. The tin oxide is readily smelted to a grade equivalent to Straits tin. This is the grade of tin formerly secured from the Malay Peninsula, now in Japanese hands.

The processing unit comprises unloading equipment, inspection

station, rotary screens for dirt removal, incinerator for charring cans to destroy fat, paper, lacquer and other combustibles, and to separate the carbonaceous residue, shredding and pre-washing equipment, storage facilities, and complete equipment for continuous detinning by the alkali process.

Rough estimates indicate that about 2,500,000 tons of tin cans are discarded annually in the U.S.A., and that about 1,000,000 tons of these could be economically collected and detinned, yielding about 11,000 tons of tin and 900,000 tons of scrap steel.

The principal problems involved are those of collection, preparation and transportation of cans. Location of plants of about 50,000 to 80,000 tons capacity near large centres of population appears the most practical solution to the transportation problem.—*The Canner.*

* * *

The "Economic" Boiler

For a number of years the Lancashire boiler has been generally accepted as the most suitable boiler for factories working with steam pressures not exceeding 200 lb. sq. in., and there can be no doubt that this type of boiler has done, and is doing, good service. Nevertheless, during the past few years the type of boiler known as the "Economic" has become deservedly popular, and various boiler-makers have designed boilers of this type. Among these is the "Cochran Sinuflo Economic Boiler", which has various distinctive features in its design which are exclusive, and which certainly deserve consideration when the question of "what boiler to buy" calls for an answer. In the horizontal multi-tubular dry-back type, usually operating with the aid of an induced draught fan, no brickwork setting is needed, and the usual losses associated with boilers in brickwork setting is avoided—a very important feature—though, of course, it is imperative that the boiler be well insulated to minimise radiation losses.

A distinctive feature of the above-mentioned boiler is the use of the patented "Sinuflo" tubes, which, from the engineers' point of view, are extremely efficient in transmitting heat to the water. A point to be noted is that they are widely spaced to promote rapid circulation of the water. In some boilers the area of the combustion chamber is not nearly large enough to encourage rapid and efficient combustion, but that weakness appears to be completely avoided, as also is unnecessary radiation loss from the combustion chamber, the latter being accomplished by a suitable heat insulator which is fitted between the brickwork and the casing.

The general construction suggests that the boiler will withstand reasonably hard "driving", which can be controlled by the induced draught fan which forms an important part of the equipment. The boiler is capable of giving highly efficient service with coke, oil, or coke-oven gas, as well as with coal. This type of boiler, like most others, burns solid fuel at the highest efficiency when a mechanical stoker feeding *graded* coal is used. Test figures quoted by the makers show efficiency of 75 to 82 per cent. (on *net* calorific value of fuel), which are very creditable.

* * *

Control of World's Tea

Although concrete arrangements are believed not yet to have been made, London tea market circles are confident that the whole world's tea supply will shortly be brought under the control of the British Ministry of Food, acting on behalf of the Allied nations as a whole. This development is considered logical and indeed overdue, states *The Financial News.*

The present position is that the Ministry of Food ensures supplies to the United Kingdom by annual contracts with tea producers in India, Ceylon, East Africa and, formerly, the Netherlands East Indies, Malaya and China.

What is now contemplated, according to trade circles, is that the Ministry of Food shall contract for the whole crops of the producing countries instead of for such proportions of them as were required for the United Kingdom, and that the Ministry shall resell to other countries in quantities and at prices in due proportion with the United Kingdom's supplies.

Assn. of Scientific Workers

The twenty-fifth annual council meeting of the Association of Scientific Workers was held on May 2 and 3 under the chairmanship of Mr. R. A. Watson Watt, F.R.S., the new President. There was an attendance of about 200 delegates representing the 84 branches into which the membership of over 5,000 is organised.

In his presidential address Mr. Watson Watt said that the most important step taken during the previous year had been the re-registration of the Association as a trade union, and its subsequent affiliation to the T.U.C. An enormous growth of the Association had taken place since that step had been taken.

Another landmark was the lead which the Association had given to British scientists by its organisation of the January Conference on "Science and the War Effort". Mr. Watson Watt spoke of the "cushion defences", which had simply absorbed the shock of the well-founded criticisms voiced at that time of the way in which science was being used in the national effort, and emphasised the necessity for perseverance if positive and valuable results were to be achieved.

The Industrial Committee's report was presented by Mr. Henley and formed an encouraging record of successful action by the Association in the trade union field.

* * *

The Cake and Biscuit Manufacturers' Wartime Alliance, Ltd.

An informative booklet has been issued by the above on the "Price Control of Biscuits", the contents of which are as follows: Explanation of the Biscuits (Maximum Retail Prices) Order, 1942, and Regulations of the Alliance; Conditions of Sale; Schedules of Maximum Nett Prices and Appendices.

A summary is given of the principal provisions of the Biscuits (Maximum Retail Prices) Order, 1942, regulating the price of biscuits to the public, together with full particulars of the Price Control Scheme agreed between the Ministry of Food and the Cake and Biscuit Manufacturers' Wartime Alliance, Ltd., fixing prices of biscuits for the manufacturer, distributor and consumer.

It is pointed out that the provisions of the Biscuits (Maximum Retail Prices) Order are summarised for convenience only and that manufacturers and distributors should acquaint themselves with its specific terms. The address of the Cake and Biscuit Manufacturers' Wartime Alliance, Ltd., is Corn Exchange Buildings, City Walls, Chester.

* * *

Compressed Dried Milk

If dried milk were compressed into blocks and not packed in tins it is believed that such compression would prevent the air from reaching individual grains of the milk, thus avoiding decomposition.

Investigations have accordingly been put in hand by the Australian Council for Scientific and Industrial Research, acting upon a suggestion from the Department of Commerce. The results have shown that under high pressure, dried whole-cream milk powder can be moulded into a firm block and the volume reduced by more than one-half; 33 lb. of the powder can be compressed into a cube, each side of which is about 9 inches long. This block contains the food material from 26 gallons or 208 pints of milk. The blocks can be powdered and beaten up in water to reconvert them to milk. A trial shipment of half a ton is expected.

* * *

Oil-Retaining Bronze

Oil-retaining bronze bearings are of interest in connection with the operation of plant and machinery in the food industries. They are made by very high-pressure die pressing, and contain, because of the micro-pores, up to 30 per cent. by volume of oil, although they are almost as strong as the cast metal, with a specific gravity of 5·8 to 6·5 and a crushing load of 70,000 lb. per sq. in. This oil exudes according to the variation in pressure in the bearing, and gives a permanent film of oil which is enough to last for the life of the machine, up to, say, 1,000,000 revs. The lubrication is extremely efficient, and one of the main points is that by this means completely inaccessible bearings are lubricated without difficulty. They are made by the British Bound Brook Bearing Co.

OBITER DICTA

I was more fortunate than any man deserved to be in finding Professor J. C. Drummond, who gave me his accumulated knowledge about the science of nutrition, which I have since tried to apply.—*Lord Woolton.*

* * *

In charge of the Experimental Kitchen and Food Advice Division is Miss J. E. McLeod, a Glasgow girl, with dark brown hair and a lovely fair skin.—*The Star Man.*

* * *

Although there had as yet been no addition of calcium to the National loaf, many complaints were being received about the bad effects on the health of that "addition".—*Professor J. C. Drummond.*

* * *

200 million gallons of milk are lost yearly through diseases of dairy cattle. It is hoped to control these diseases by a voluntary "panel" insurance scheme.—*Daily Telegraph.*

* * *

I don't mind paying £1,000 a month in fines so long as I don't go to prison. —*Tom Tweed, Black Market Butcher.*

* * *

We very much appreciate your attitude, and while we should have been pleased to have sent you a commission on the equipment we sold as a result of your Information Service, we note you prefer not to accept a reward for your services in the matter.—*A subscriber writing to* FOOD MANUFACTURE.

* * *

Lord Woolton's scheme for the control and distribution of Britain's commercial tomato crop is strongly opposed by the National Growers' Association, whose executive has told the Ministry of Food that it will have nothing to do with the proposal.—*The Times.*

* * *

The chief complaint of housewives was that it was more expensive to buy fruit and make jam than to purchase preserves. There was an opportunity for setting up a preserving factory and thus starting a new industry, which would include the canning of fruit, vegetables and other things.—*Penryn Food Control Committee.*

* * *

This year, 82 per cent. of our total glass is planted with tomatoes and 80 per cent. of our outdoor ground is growing food crops. This example is typical of the war effort being made by all fruit growers, who, it is estimated, will this season produce fifty thousand tons of tomatoes from under glass.—*P. C. Kay in a letter to The Times.*

Gordon Fell Clark

We hear of our good friend Gordon Fell Clark, whose presence used to mean so much at the Canning Conventions. He is out East with the rank of major. Many of his friends in the trade, we know, will join us in sending him a message for his safety and continued success.

* * *

Brown and Rawcliffe, Ltd., and P.P. Press—Amalgamation

The amalgamation is announced between Brown and Rawcliffe, Ltd., and the P.P. Press to take effect from July 1, 1942.

The united firms will operate as Brown and Bibby, Limited, with head office at King Edward Street, Liverpool 3. Mr. A. E. Brown is chairman, Mr. J. K. Bibby deputy chairman, and Mr. L. H. Brown managing director.

Until the end of the war the production of high-class photo lithography, letterpress and folding boxes will be concentrated, continued and developed in three dispersed factories in and around Liverpool.

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Sulfatine—A Correction

In Arthur Holden and Sons' advertisement in FOOD MANUFACTURE, June, page xxxiii, under "Sulfatine", the paragraph should have run:

> "The sulphur-resisting Zinnatine *prevents* those blackening stains in vegetable packs."

By a printer's error the word "prevents" was printed as "presents".

* * *

Lineside Allotments

L.M.S. railwaymen cultivated 5,808,000 square yards of lineside allotments during 1941, the highest total ever recorded on the L.M.S. system.

The average size of the allotments is about 30 yards long by 10 yards wide, and the work involved is equal to cultivating a strip of land of sufficient width to take a double-track railway from London to Dumfries, or a distance of about 300 miles.

This area was cultivated by some 20,000 allotment holders.

Information and Advice

Concentrated Orange Juice

7,669. *A concentrated orange juice is delivered to us in bulk in barrels, and we repack in small containers for sale to our customers. Owing to the very thick and sticky nature of the juice it is impossible to secure a free flow from the barrel, as would be the case with treacle or other similar fluids. Furthermore, the barrels used contain no air inlet. It is an extremely slow process emptying the barrels and we are wondering whether you can suggest any special method for emptying the barrels in a quicker manner.* (Gloucester.)

With reference to your problem, it is just a little difficult to advise without being on the spot, but it would appear to us that if you could thoroughly warm the barrel and its contents, it would lose a good deal of its viscosity.

You would also, of course, need to make a good-sized air inlet in the barrel to facilitate emptying.

Fish Cakes

7,827. *I would be glad if you could give me a recipe for the manufacture of fish cakes from salt cod, potatoes, etc.*

(1) *How long should the fish be soaked?*

(2) *Should the fish be boiled or steamed?*

(3) *Which is the best kind of binder, and is an egg powder or egg substitute suitable?*

(4) *Which is the best kind of seasoning, parsley or sage? Is vinegar used, or necessary?*

(5) *Would the fish—after 24 hours' soaking—be salty enough not to require any salt for the potatoes when they are mixed? If a little suet could be obtained would that benefit in any way? These cakes will not be fried when sent out but left to the consumer to fry.* (Barnsley.)

The following may form the basis for trials:

(1) Fish should be soaked for about 48 hours with several changes of water.

(2) Boiling the fish is best.

(3) If you can get egg powder, so much the better, but we are afraid this is difficult to obtain. Egg substitute is entirely useless for the purpose.

(4) Seasoning is entirely a matter of taste. Mixed herbs might be used, but some people do not like this. Pepper flavouring would probably be sufficient. However, this is a thing that you would be obliged to decide for yourself. No vinegar is necessary.

(5) After 24 or 48 hours the fish will certainly be salty enough not to require any further salt added. The main trouble is getting sufficient salt out of the cod. A little suet would be quite useful.

The approximate composition of a fish cake was, when the materials were available:

3 lb. cooked fish.
3½ lb. mashed potatoes.
½ lb. rusk.
½ pint milk.
3 eggs.

Pass fish through the mincer, not too fine, say ½ in., add rusk, season, add milk and thoroughly stir and shape into small round cakes.

The matter of eggs, or egg powder, will be the difficulty, and trials would have to be made to find a binder.

If the addition of milk or milk powder is not feasible, water could be substituted.

The addition of about 10 per cent. suet would probably help.

It would be better to cook the mixture in a jacketed pan before making into cakes.

A recipe for fish roll is as follows:

Soak the dried salted cod in several changes of water for about two days, for every 20 lb. add 12 lb. of scalded ground rice, 1 lb. of cornflour (dry) and 2 lb. of rusk (dry), with such seasonings as salt, pepper and ground mace. 20 lb. of boiled bacon or ham trimmings are also added. The rusk and the dried cornflour are added to the finely minced other ingredients.

Information Supplied

7,565. *We would be obliged if you could recommend to us any suppliers of flavourings and spices for soup powders.* (Newcastle-upon-Tyne.)

7,570. *We wondered if you could let us have a complete list of acid calcium phosphate stockists or manufacturers in this country. We are in urgent need of supplies for continuing our trade in self-raising flour, which to our minds is an important article to the public, and any help you can give us will be greatly appreciated.* (Croydon.)

7,588. *As subscribers to your publication we would be glad if you could furnish us with manufacturers of rusk for preserved meat canning.* (London.)

7,595. *I have been doing some work for a firm in S. Africa and I want to get hold of some sodium glutamate—the meat-flavoured compound. Could you let me know the names and addresses of any manufacturers in this country?* (Manchester.)

7,596. *We would be glad to hear if you can supply any information about the preservation of whole tomatoes or any process to follow out.* (Manchester.)

7,597. *Will you kindly inform us what thickening agents are used in the manufacture of salad creams, mayonnaise, etc.? We are aware that tragacanth, acacia, cornflour, and cooked egg albumen are used, but these do not give such a finished product as in some of the brands now on the market.* (Leeds.)

7,603. *I am desirous of obtaining some information concerning the ingredients of an egg powder or egg substitute. Unfortunately I do not possess the literature for reference purposes, and I should be much obliged if you could give me any information on this subject which you may have at hand.* (Kettering.)

7,618. *I should be very glad if you could give me a basic recipe for thick brown gravy, with special regard to the colouring matter.* (Cardiff.)

7,622. *We are interested in an article published in* FOOD MANUFACTURE *of July 1, 1941, under "A New Whey Product". We should esteem it a favour if you would be kind enough to put us in touch with anyone who would be in a position to offer us supplies.* (Ipswich.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Abstracts of Recent Specifications

Improvements Relating to the Clarification of Liquids

This invention relates to the clarification of liquids containing finely divided matter in suspension by depositing the said matter and separating the liquid from the resulting deposit.

Considerable difficulty is encountered in separating fine suspended particles from certain liquors, and this applies to many industrial effluents and to dirty mineral or vegetable oils which are difficult to filter rapidly by any ordinary means, and frequently, owing to the high content of solid present, it is necessary to stop the filter for backflushing and cleansing the filter bed.

The object of the present invention is to effect separation of suspended matter by flocculating it by means of a colloidal substance in the presence of a finely divided magnetic material, such as powdered iron or black magnetic iron oxide, with the result that the suspended matter and the added magnetic material are both entrained in and deposited with the gelatinous precipitate of the colloidal substance; after which the presence of the magnetic material in the deposited mass enables the latter to be taken out from the liquid by means of a magnetic separator. It is convenient to stir the iron or magnetic oxide into the liquid to be treated, and then to add a sufficient amount of an aqueous suspension of an organic colloid to ensure complete entrainment of the suspended matter. Any of the above-mentioned organic colloids may be used with a suitable precipitating agent. In cases in which the effluent water already contains sufficient electrolyte, no precipitating agent need be added, but if the water is naturally soft or has been artificially softened, a solution of calcium chloride, lime or other suitable electrolyte should be added. The acid mucilage of the common bulrush (*Typhæ augustifolia*), however, may be used without any additional reagent for flocculating the suspended solid matter and entraining the iron or iron oxide.

The treated material may then be run through a magnetic separator and the gel containing the entrained iron and suspended matter rapidly and effectively removed from the liquid on the surface of the drum or belt of a magnetic separator.

When the invention is applied to the treatment of vegetable oils and a colloidal suspension in an alkaline condition is used, there is a liability for a certain amount of emulsification to occur during the mixing while the neutralisation of alkalinity with ordinary agents would precipitate the colloid and thus render it ineffective for the purpose in question. It is found, however, that this difficulty may be overcome by acidifying the material with an aqueous acid extract of rhubarb, or with tartaric acid, or both.

542,605. Conrad Lawrence Walsh and Jack May.

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton, Buildings, London, W.C. 2, at the uniform price of 1s. each.

542,661. BEASLEY, H. H., FRENCH, G. W., and BEASLEY, FRENCH AND CO., LTD.: Method of and means for arranging and feeding envelopes or bags for gumming the flaps thereof in envelope or bag-making machines.

542,716. WOOD AND CO., LTD., H., BRITTON, W., and TAGG, W. H.: Quickly releasable pipe joints.

542,748. M. W. PRODUCTIONS, LTD., and WARING, A.: Drip-feed lubricators.

542,768. PEACOCK, A. M.: Cardboard or like boxes or containers.

542,846. BURGESS ZEOLITE CO., LTD.: Treatment of milk and products thereof.

542,892. BRITISH THOMSON-HOUSTON CO., LTD.: Thermostatically controlled switch devices.

542,937. LEAN, O. B., BOVINGDON, H. H. S., and IMPERIAL CHEMICAL INDUSTRIES, LTD.: Treatment of food grain.

543,082. DRYSDALE AND CO., LTD., and DRYSDALE, J. W. W.: Self-priming centrifugal pump installations.

543,090. ENGEL, W.: Preserving foodstuffs in containers.

543,109. STRAPPINGS, LTD., and EATON, J. A.: Wire-tying apparatus.

543,132. HARBER, L. S., and BAKER PERKINS, LTD.: Manufacture of bread.

543,221. NEILSON, R. J.: Ice cream freezing vessel.

543,237. CLELAND, LTD., W. W., and BUCHMAN, A.: Boxes of paper, cardboard, or the like material.

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

KING BOMBA.—616,510. Dried and cooked fruits and vegetables, edible oils and fats. **Costanza Recchioni,** 37, Old Compton Street, Soho, London, W. 1; Merchant.

KING BOMBA.—616,511. Coffee; food preparations made from cereals. **Costanza Recchioni,** 37, Old Compton Street, Soho, London, W. 1; Merchant.

BEMOY.—616,601. Vegetable extracts (for food) and meat extracts **B M-Y, Ltd.,** The Maltex Factory, Cheapside, Hyde, Cheshire; Brewers and Wine and Spirit Merchants.

FROPS.—616,689. Sweetmeats and confectionery. **Tavener Rutledge, Ltd.,** 68, Beech Street, Edge Lane, Liverpool, 7; Manufacturing Confectioners.

MASCOJELY.—616,823. Jellies (for food). **The Scottish Flavour and Colour Co., Ltd.,** Mayfield Works, 27 to 29, Ratcliffe Terrace, Edinburgh; Manufacturers and Merchants. To be Associated with No. 615,282 (3312).

THREE COOKS.—616,875. All goods included in Class 30. **"Ark" Food Products, Ltd.,** 41, Queen's Road, Reading; Manufacturers. To be Associated with No. 616,876 (3327) xxx and another.

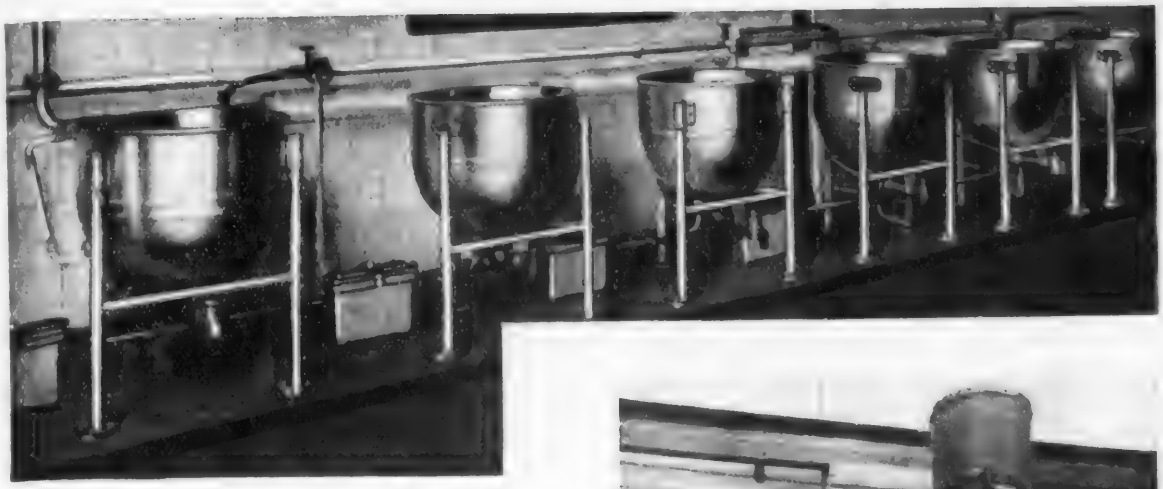
THREE COOKS.—616,876. All goods included in Class 30. **"Ark" Food Products, Ltd.,** 41, Queens Road, Reading; Manufacturers. To be Associated with No. 616,875 (3327) xxx and another.

New Companies

Greasley and Sons, Limited. (371662.) 171, Brunswick Street, Leicester. To carry on bus. of bakers, pastrycooks, grocers, etc. £6,000. Dirs.: J. Greasley, 6, Hermitage Road, Birstall, Leicester; F. G. Greasley, 500, Loughborough Road, Birstall, Leicester; J. Greasley, Jnr., 512, Loughborough Road, Birstall, Leicester. J. Greasley is permanent governing dir. and chairman.

Bevens and Son, Limited. (371677.) 22, Old Mill Road, Chelston, Torquay. To carry on bus. of bakers, pastrycooks, millers, etc. £2,000. Dirs.: W. J. Bevens, sen., 78, Queen Street, Newton Abbot; W. J. Bevens, jnr., 22, Old Mill Road, Chelston, Torquay.

George W. M. Armour, Limited. (371686.) 188-192, Sutton Court Road, Chiswick, W. 4. To carry on bus. of mnfrs. of and dlrs. in confectionery, ices, and preserves, etc. £1,000. Permt. mang. dir.: G. W. M. Armour, 25, River Court, Portsmouth Road, Surbiton, Surrey.



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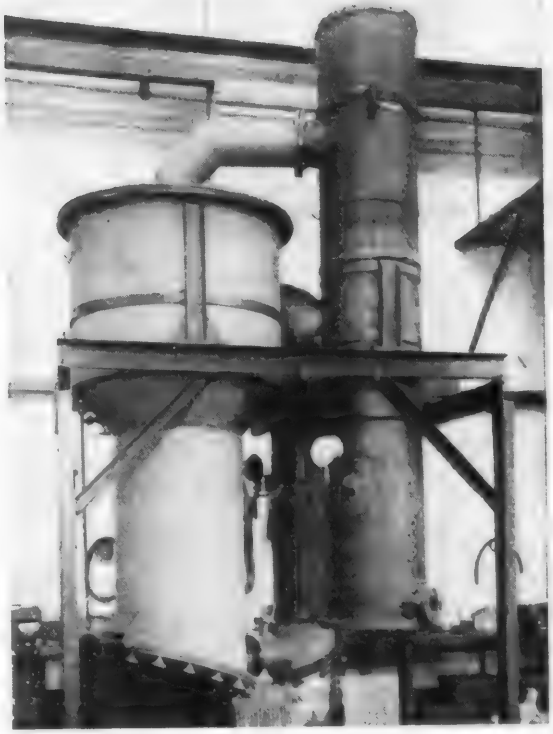
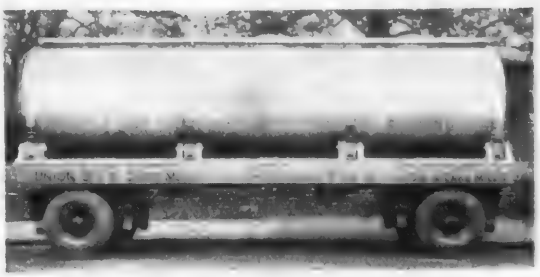


Concentrating Plant



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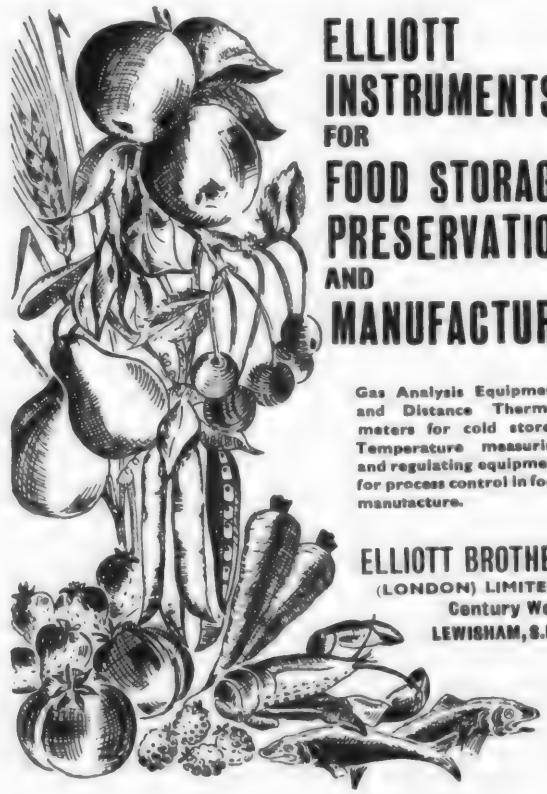

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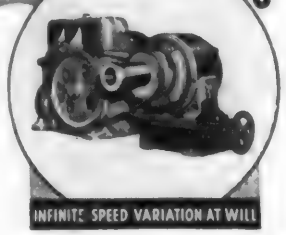

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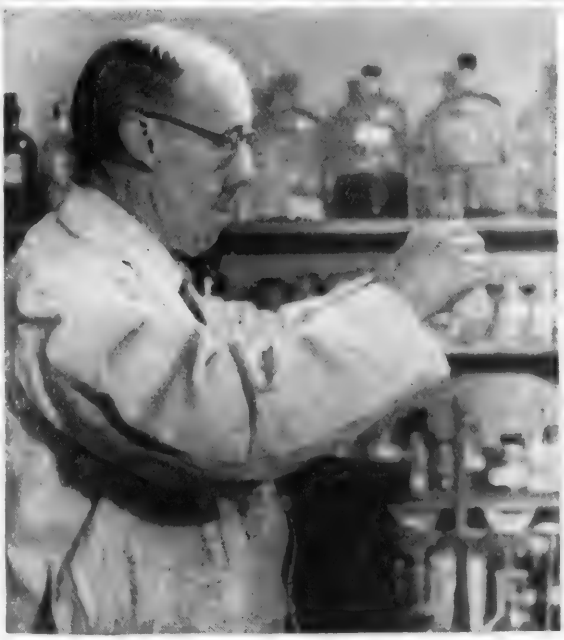

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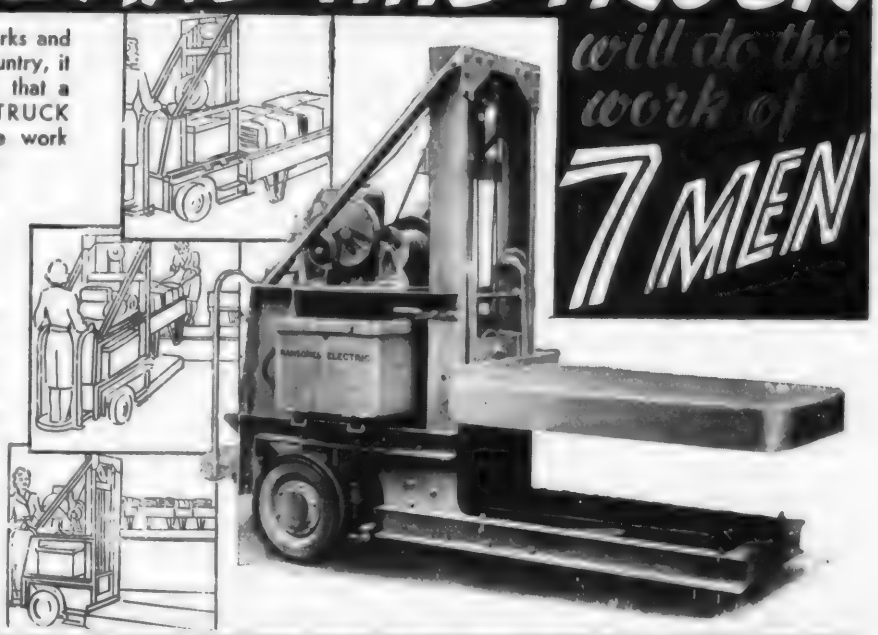

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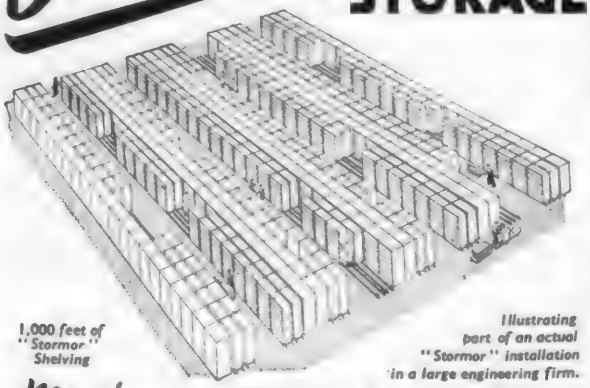

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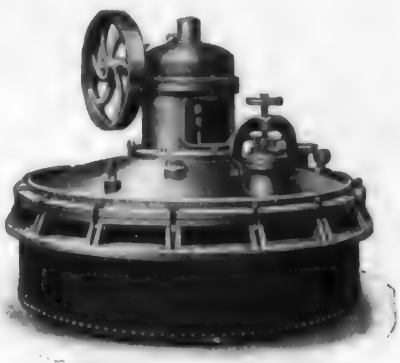

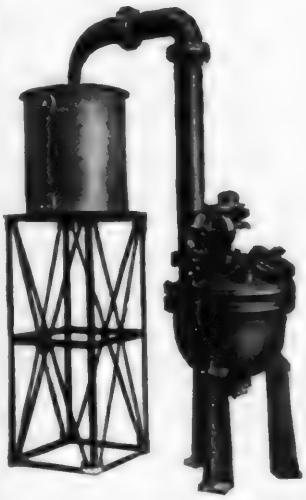

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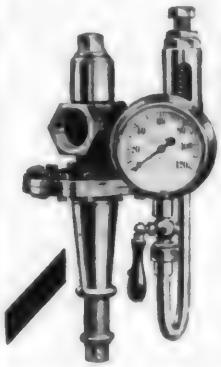

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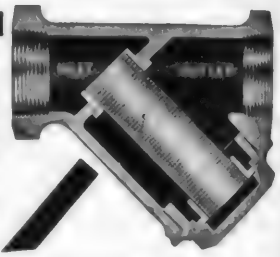

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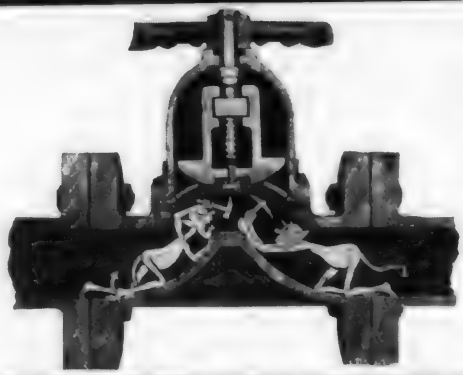

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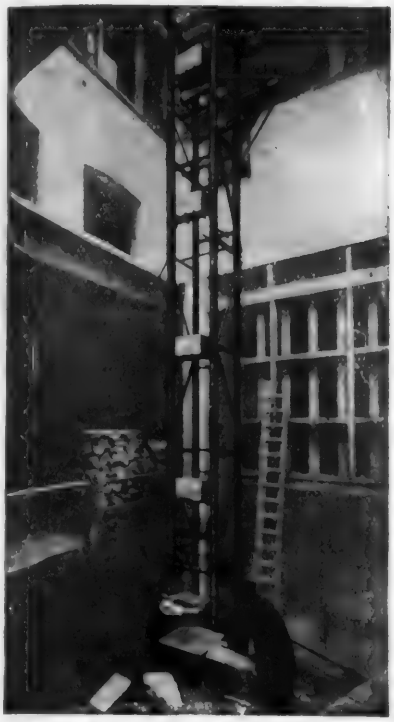

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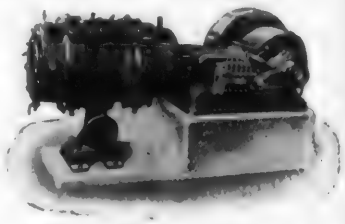

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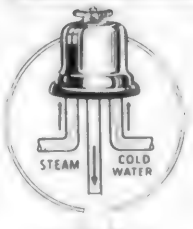

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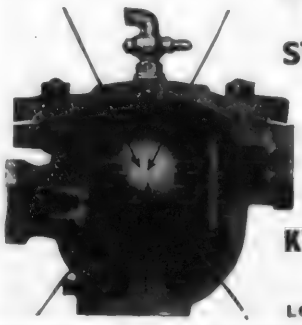

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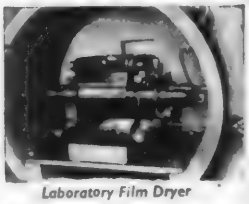

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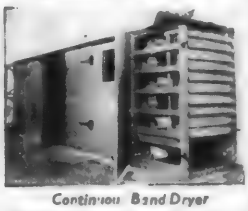

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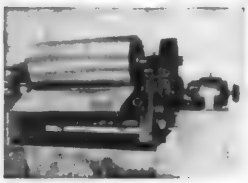

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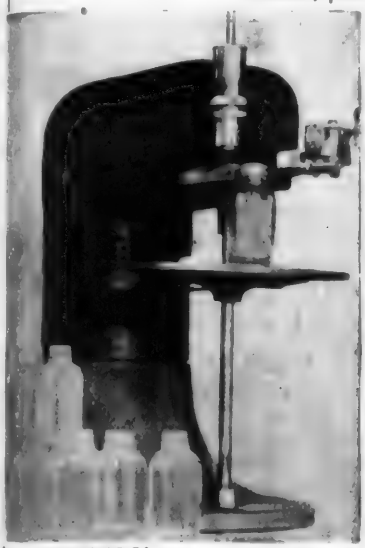

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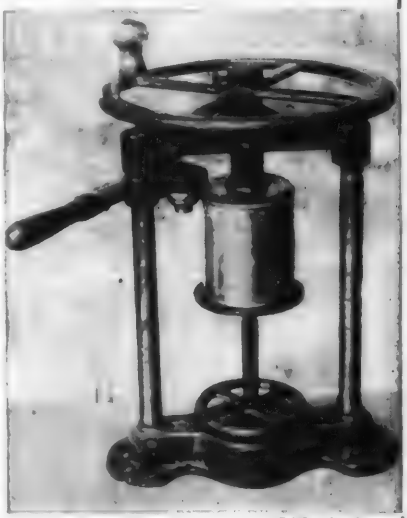

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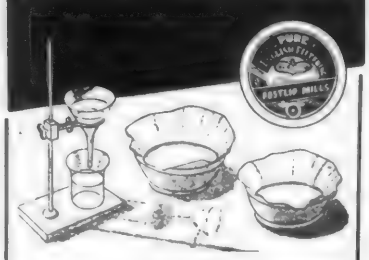

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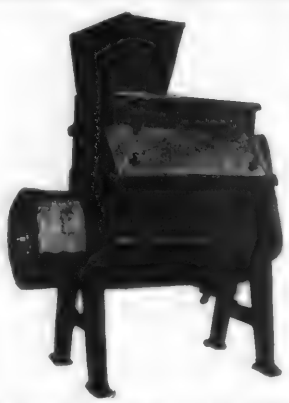

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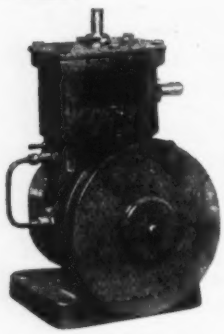

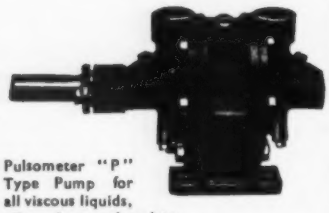

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